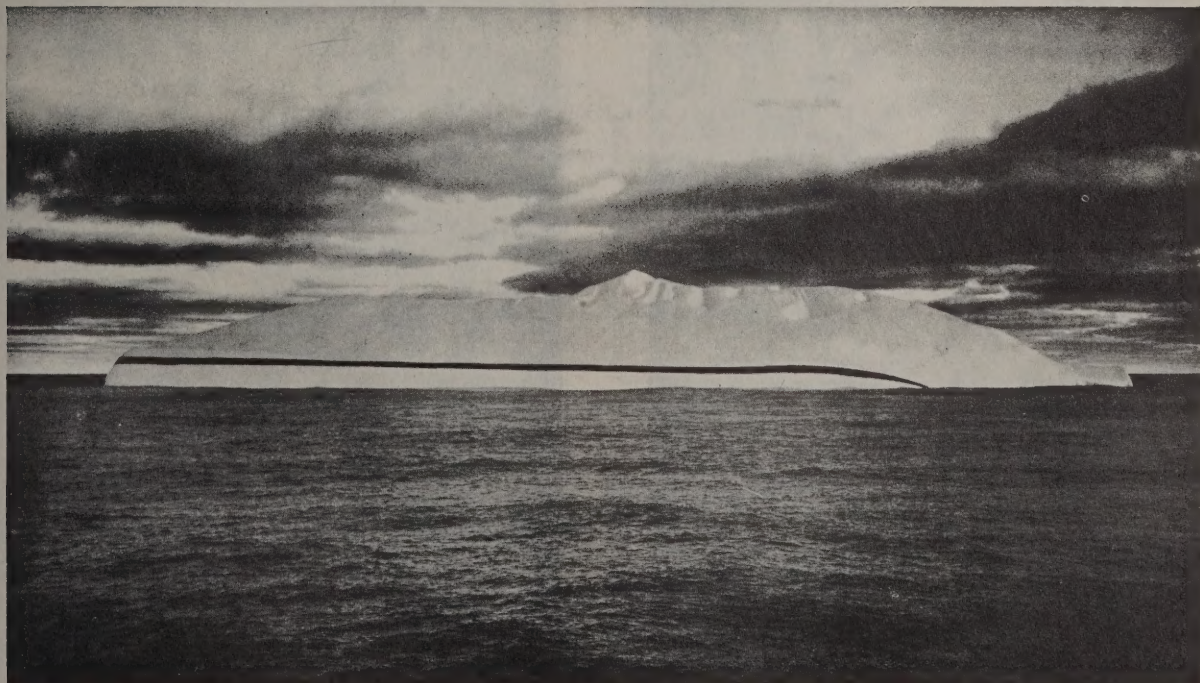
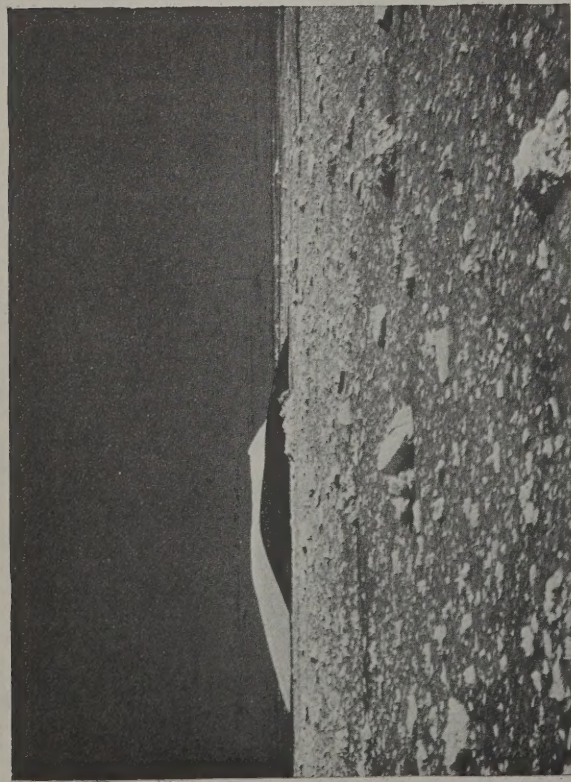


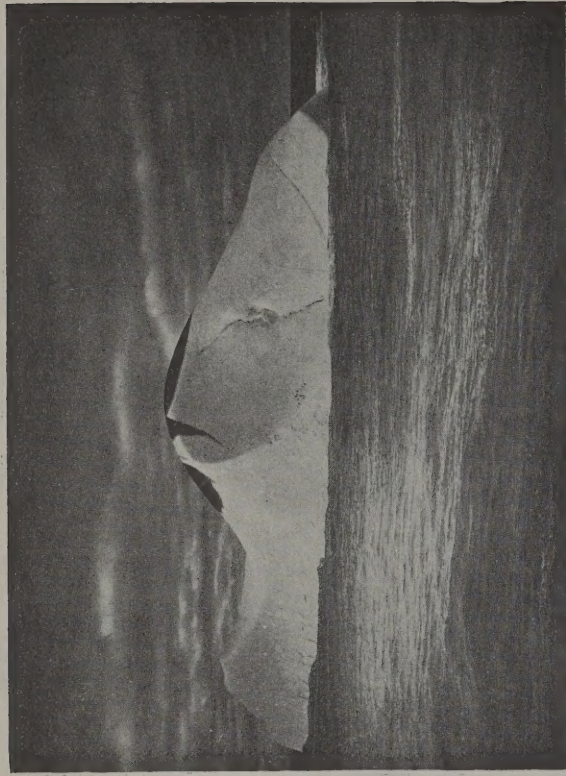
THE POLAR TIMES



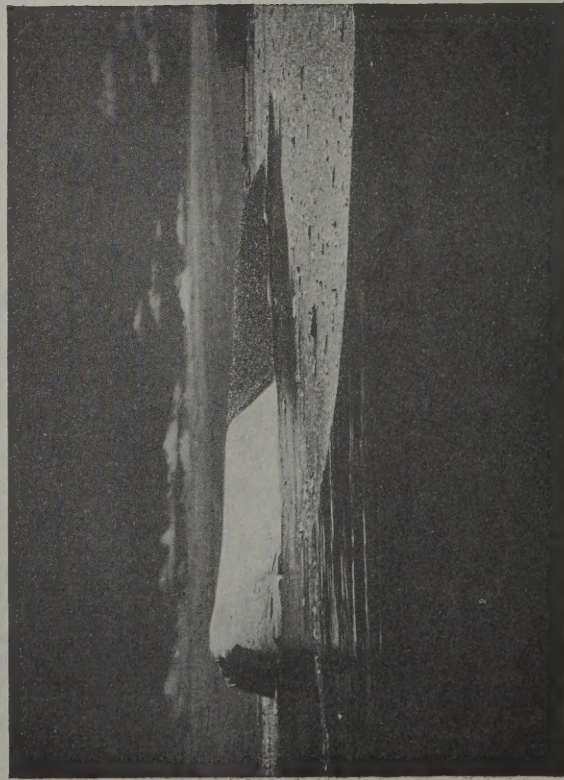
8. Banded berg seen between South Georgia and the South Sandwich Islands



4. Black and white berg seen near Elephant Island



6. Black-capped berg seen between South Georgia and the South Sandwich Islands



5. Another view of the same berg



7. Another view of the same berg

The Polar Times

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No. 18.

JUNE 1944

OBSERVATIONS ON CERTAIN ANTARCTIC ICEBERGS

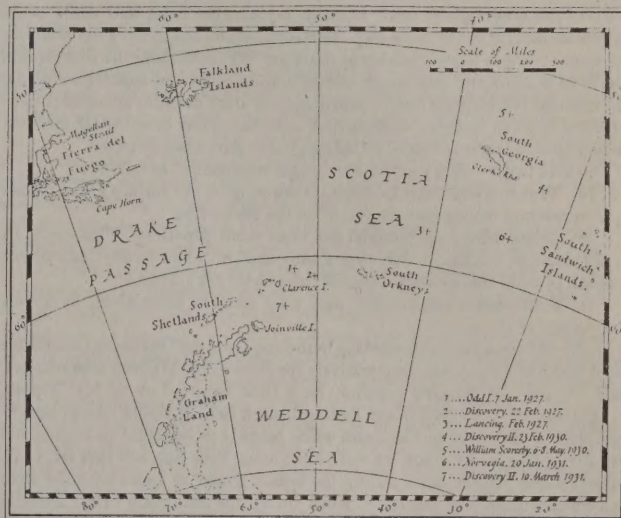
J. M. WORDIE AND STANLEY KEMP, D.S.C., F.R.S.

IN the course of the oceanographical investigations which are being made in the Antarctic by the research vessels employed by the Discovery Committee a number of remarkable icebergs have been sighted. Some of these are of interest on account of their enormous size, and others on account of their dark colour. The present note is concerned with bergs of both these kinds.

Bergs of dark colour, called for convenience black and white bergs, have been observed with some frequency off the mouth of the Weddell Sea. When opportunity occurred for close examination it was found that these bergs are of two distinct varieties: one of them is the true morainic berg, in which the dark portion is quite black and opaque and consists of mud and stones which are often clearly visible; while in the other variety the dark part proves on closer approach to be translucent and of a very deep green colour, resembling that of some kinds of glass used in bottle making, and mud and stones appear to be absent. We can speak then of black and white bergs falling into two subdivisions, the morainic and the bottle-green bergs. At a distance the two kinds resemble each other very closely, and it has been found that they have some features in common. In both of them as seen by us the dark part is always smoothly rounded by water action, and in both, with few exceptions, the junction between the white and dark parts is a perfectly straight clean-cut plane.

To obtain samples of either variety for examination is not an easy matter, for in the heavy swells that prevail close approach is often impossible and the surface is generally so smoothly rounded that it is extremely difficult to chip pieces from the berg. Rifle shots at close quarters have been tried without success. So far, on the Discovery Committee's ships we have not been able to collect any sample from a bottle-green berg; the only material we possess is from a morainic berg, collected by Mr. G. W. Rayner in the *William Scoresby* at 70° 01' S., 100° 39' W., on 1 February 1930, and this has been examined for us by Mr. G. H. Tipper. He reports that there are four large pebbles, of pink granite, hornfels, banded grey quartzite, and dark quartzite respectively; these specimens show few signs of ice action and are free from scratches or striae. The silt associated with the pebbles is dark grey when dried and almost black when wet; the very fine portions are composed of minute angular fragments of quartz and other minerals; the coarser material is a mixture of angular and rounded fragments of igneous and metamorphic rock. The silt is slightly calcareous, due to the presence of foraminifera and minute lamellibranchs: the foraminifera, determined by Dr. W. A. Macfadyen, are all present-day species. The presence of marine organisms with the morainic material is unusual. They may perhaps have been scraped off the sea bottom by the berg before overturning. It is more likely however that part of the sea floor has been incorporated in the parent glacier in the way suggested by Professor Debenham in his account of raised marine muds in Antarctica,¹ and that the berg can be described therefore as truly morainic.

In addition one of us (J. M. W.) made an examination of a black and white berg found in the Weddell Sea pack-ice in 1915. The berg in question was known on board the *Endurance* as the Stained Berg by reason of its dark appearance seen from the ship 6 miles away. It was visited on 24 September 1915, and again on 17 December. The berg was measured as 110 feet high, and consisted of a lower white portion overlain by dark ice about 50 feet in thickness. The boundary between these was straight and even, but steeply tilted. The lower part was blue ice, close and compact in structure, not showing any stratification, but with the same névé structure as barrier-ice; the upper dark part had some very small dirt specks scattered through it, and the structure was described as "very bubbly—almost névé-like." A special feature in the upper part was the presence of steeply inclined bedding planes, described as recalling the even stratification seen in barrier bergs; these were parallel to the line of junction between the black and white portions. On the day of the first visit it was thought that the darkness of the upper portion was probably due more to its peculiar "bubbly" structure than to the dust particles. It was emphasized that the bedding was not of the nature of dirt bands but of the same nature as



Positions of bergs seen by ships in the Antarctic

barrier stratification. Specimens of the two kinds of ice were later examined at the ship together with a portion from an undoubted barrier berg. The specific gravity of the latter was 0.874, of the dark ice of the Stained Berg 0.871, and of the lower clear ice 0.884. Pieces of the dark ice showed bedding planes on a fine scale when held up to the light. The samples of ice were then melted down, and from the dark ice a very minute residue was left of fine mud and what was presumed to be plant tissue. Somewhat similar residues had previously been found at two other bergs earlier in the year. A note was made at the time that somewhere round the Weddell Sea there must have been "bare rock with plant life, fragments of which are blown by the wind on to the near-by barrier and glaciers, where they are then cemented into névé."

These observations introduce the view therefore that some of the black and white bergs may owe their dark colouring to fine material transported by the wind on to the surface of the glacier.

Illustrations of bottle-green bergs are given in Plates 1-3. The first two of these were found off Visokoi Island in the South Sandwich group on 2 March 1930. Plate 3 is a photograph of a berg seen on 31 October 1930, in 54° 44' S., 27° 33' W., and shows how closely such bergs can resemble partially submerged rocks.

In most of the black and white bergs, as already remarked, a clear-cut plane of demarcation is to be found between the white and black parts, as shown in Plate 2 and in the berg, presumably morainic, illustrated in Plates 4 and 5. This berg was seen on 18 December 1930, in 60° 13' 15" S., 50° 51' 30" W. On the theory of wind-borne detritus the plane of demarcation must originally have been more or less horizontal, the detritus having fallen on the level surface of the glacier. Further accumulations of névé, but free of dust, might result in the formation of the very remarkable banded berg seen on 1 April 1931, north-west of the South Sandwich Islands in 56° 30' S., 31° 28' W., and shown in Plate 8. This berg was about 140 feet high and 1500 feet in length and was traversed from end to end by a perfectly straight band of dark material 15 feet thick. Along the face shown in the photograph this band was 40 feet above water-level, but at the sides it was seen to dip downwards. The berg was smooth and wedge-shaped, and had evidently capsized.

Another peculiar berg is illustrated in Plates 6 and 7, and from the fact that it was found only some 30 miles to the north of the banded berg (56° 33' S.,

¹ From this point of view the black ice appeared greyish, owing to the reflection of points of light from its faceted surface.

¹ *Quart. Journ. Geol. Soc.*, vol. 75 (1919), pp. 51-73.

32° 07' W.), and on the same day, it appears likely that it came from the same locality. It was domed, about 1500 feet in length and 150 feet high at one end. This was one of the few black and white bergs sighted which does not show the usual straight line of demarcation between black and white. The dome is capped with black, but on two sides blackened portions extend downwards in V-shaped fashion, giving the impression that material might have collected in crevasses in the glacier surface. In this berg the white ice was perfectly smooth, but it was noted that the black parts were pitted all over with shallow pock-marks.

There is no evidence that the black ice melts more quickly than the white; as will be seen from the photographs, the black and white portions merge without any alteration in surface outline. The smoothly rounded outlines are no doubt due to water action before the berg capsized, ice above water melting very slowly in the low air temperatures of these latitudes.

From the observations made it seems certain that black and white bergs are not all formed in the same way. In the one examined in 1915 the evidence points to an origin from wind-borne detritus. We think therefore that minute specks of wind-borne dust might possibly account for the appearance of the unexplained bottle-green bergs, which on their dark portions sometimes have a faceted or even honeycombed surface. On this point however we feel that further speculation is idle until actual specimens have been collected.

The dark bergs which we have seen might be classified as follows:

(a) True morainic, due to detritus collecting on the surface of the glacier or to material having been frozen in on the under side.

(b) Others where the material has been wind deposited. This might be the result of volcanic action over a wide area, or, more locally, may be the result of wind transporting material from bare rock surfaces.

(c) Bottle-green bergs which may be a class by themselves, or merely a variety of (b).

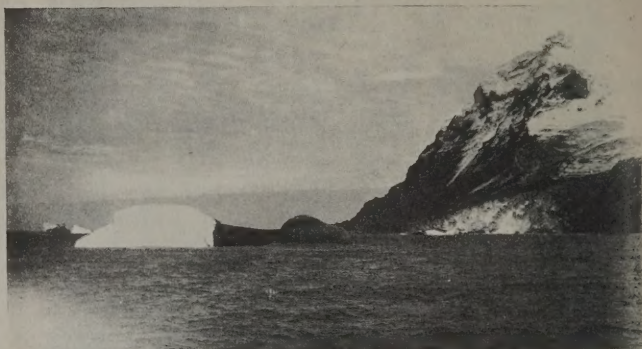
In the experience of those working in the vessels of the Discovery Committee black and white bergs are comparatively frequent in the Weddell area between long. 16° and 51° W. One morainic berg (that reported on by Mr. Tipper, p. 428) has also been seen in the Bellingshausen Sea. It would appear significant that no reference to black and white bergs is to be found in Wright and Priestley's *Glaciology*, based on work done in the Ross Sea, and that Dr. E. H. Marshall saw none of them during the season which he spent with the Ross Sea whaling fleet. The *Discovery*, when under the leadership of Sir Douglas Mawson in 1930, reported black and white bergs from 55° 40' E. and 56° 24' E. A similar scarcity has also been the experience of the *Discovery II*, which has just completed a circumnavigation of the Antarctic: seven visits were made to the ice edge, and on each occasion some time was spent there. No morainic bergs were seen, and the only record is that of a bottle-green berg seen near the South Sandwich Islands on 25 November 1932 in 61° 32' S., 40° 50' W. We are almost forced to conclude therefore that morainic and similar bergs are more common in the Weddell Sea than elsewhere.

A feature of the last five years has been the number of reports coming from the South Atlantic and Weddell Sea of unusually large tabular bergs. That tabular bergs, originating from the break up of barrier ice, can be of great size has long been known. The *Erebus*, *Challenger*, *Nimrod*, *Terra Nova*, and *Endurance* have all in turn reported bergs over 20 miles long; it might almost seem therefore that on an Antarctic expedition there should always be a very fair chance of seeing at least one big berg. Large bergs have also at times been reported by commercial ships (apart from whalers) making passages generally but not always in high southern latitudes. Many of these reports from commercial ships however combine great lateral extent with a quite impossible height, and although some of the records are no doubt correct they must as a class be disregarded. Reports from whaling vessels are in a different category, and are regarded as reliable. In practice it seems only safe to rely on reports from ships which encounter bergs frequently, and whose records therefore are hardly likely to be distorted. We have confined ourselves therefore to statements made by whalers, and expedition ships.

The first recent reports of large bergs from the Weddell Sea were received in 1927. A brief reference is made to these in the *Geographical Journal*, September 1927, p. 319. Since then equally large bergs have again been reported in 1930, 1931, and 1933, and the question arises whether their occurrence can be regarded as a usual feature or as something exceptional and pointing to big changes which must have taken place recently at the head of the Weddell Sea.

In 1927 the Norwegian whaler *Odd I* reported that on January 7 she steamed for nine hours at 10 knots along the north face of a tabular berg 100-130 feet in height. The position was stated as 60° 30' S., 52° W., but it is not clear if this represents the ship's noon position or some part of the berg. The place in question is about 50 miles north-east of Clarence Island (see map).

In February 1927 the *Discovery* reported large bergs on two successive days.



1. Bottle-green berg seen near Visokoi Island, South Sandwich group



2. Another bottle-green berg seen at the South Sandwich Islands



3. Bottle-green berg seen in lat. 54° 44' S., long. 27° 33' W

On the 22nd her noon position was 60° 48' S., 50° 13' W. She was then on the north side of a very large berg. The northern face of the berg was 35 miles in length, as measured by ship's log, and the ship's noon position was just a little west of the middle point of the side. The average height by sextant was 150 feet. Looking south from the north-west corner no limit to the length of the western side could be seen from the crow's nest. A sounding was made at 9 a.m. and gave a depth of 1373 fathoms. At midday, while a net was being towed, it struck bottom in an estimated depth of 600 fathoms. A second sounding at 3 p.m. only a couple of miles from the first gave 1011 fathoms. It seems almost certain that this berg was at any rate partially aground on the southern of the two ridges which have since been found between the South Orkneys and Clarence Island. On the more northerly ridge the least sounding so far obtained is 266 fathoms in 60° 10' S., 50° 29' W. It seems very probable that this was the same berg as that sighted by *Odd I*. The actual difference of the *Discovery* position is 29 miles south-east of that of *Odd I*. The *Odd I*'s position is evidently pretty rough, and nothing very exact can be said of the movement of the berg between January 7 and February 22. One would expect an easterly current, but the ridges may complicate the matter. Quite probably the berg had slewed round with its tail aground.

On February 23 the *Discovery* was off Cape Bowles, the south-west point of Clarence Island in $61^{\circ} 25' 30''$ S., $53^{\circ} 46' 00''$ W. The captain reported: "away to the southward the sea was crowded with enormous tabular bergs, one of which extended across the horizon and no limits could be seen to it." These bergs were presumably stranded in the shoal water which extends north-east from Joinville Island.

Early in February that same year the whaling factory *Lancing* reported a berg "as large as South Georgia"; the estimated centre of the berg was in $58^{\circ} 30' 30''$ S., $40^{\circ} 48'$ W. This position is over 150 miles north-east of the South Orkneys, about one-third of the way towards South Georgia. (South Georgia is about 120 miles in length.)

In this connection the records of three trading ships in the autumn of 1927 may be quoted (with the qualification however that such records are not as reliable as those of whalers and expedition ships). The *Orita* reported a "berg, very large, about 10 miles long" in $43^{\circ} 11' 30''$ S., $56^{\circ} 20'$ W. The *Winterhude* in 47° S., 52° W. reports "117 bergs sighted, one of which was about 10 miles long and rose about 150 feet above water." Both these records were made in October 1927 and in the area between the Falkland Islands and the River Plate. A third record is that of the *Tijuca*, who in December 1927 in 36° S., $49^{\circ} 20'$ W. says "17 bergs in sight. Bergs in sight all the voyage S. Georgia to Buenos Aires. 5-17 December—one berg understood to be 50 miles long."

There are no reports of bergs of exceptional size in 1928 and 1929.

In 1930 on February 23 the *Discovery II* reported a berg at least 60-70 miles in length. It was found in the course of a passage from South Georgia to the South Sandwich Islands. The ship steamed eastwards along its northern side and the north-east corner was determined to be in $55^{\circ} 07' 30''$ S., $32^{\circ} 12'$ W. The extreme westerly limit of the berg was not ascertained. The position stated is east-south-east of South Georgia, and about 40 miles beyond the Clerke Rocks.

The same year, on May 6-8, the *William Scoresby* was in $52^{\circ} 08' 30''$ S., $36^{\circ} 28'$ W., and examined a berg 45 miles along a side (stated to be the "long side") lying south-east and north-west. The height was estimated at 180-200 feet. This position is over 100 miles north of South Georgia. There is every possibility that this is the same berg as that seen by the *Discovery II* in February. The line of movement agrees well with the currents; the distance between the two positions is 240 miles, and the time interval of sixty-eight days would give a travel rate, if the berg did not ground in the interval, of $3\frac{1}{2}$ miles per day in a more or less northerly direction. It is however almost certain that the berg did not travel in a straight line but must have moved with the prevailing current first to the north-west, then north, and then north-east, and on such a course both mileage and speed will be considerably increased.

The interval of three years makes it unlikely that the 1930 records apply to the bergs seen in 1927, for it is most improbable that the bergs reported in the earlier year remained aground to the south of Clarence Island for so long a time. The trading ship records north of the Falklands in the autumn of 1927 rather suggest that the bergs moved on immediately.

On 20 January 1931 the *Norwegia* reported a berg 40 miles long in 58° S., 34° W. This position is about 180 miles south-south-east of South Georgia.

On 10 March 1931 the *Discovery II* reported a berg whose western side was 20 miles, lying in a position approximately 62° S., 53° W. It was found therefore in practically the same spot as the "ice island" seen by the *Discovery* on the shoal ground south of Clarence Island on 23 February 1927.

There are no records of any very large bergs in 1932, but in February 1933

the *Discovery II* reported an iceberg 38 miles in length by $12\frac{1}{2}$ miles in breadth situated about 40 miles south of Clarence Island. This is in very nearly the same locality as the bergs seen in 1926 and 1931.

It will be seen therefore that three records at least refer to bergs on shoal ground near Clarence Island, and we have had to consider whether these indicate one berg only or a succession of big bergs stranding at this point. We think it most improbable that any berg, however large, will persist from one summer to the next, once it has got clear of the close pack-ice. The currents, which always have a northerly component, are strongest in the spring, and it is at this time, when the pack breaks up, that the bergs are set free. They are little affected by wind, and can move steadily through loose pack at right angles to the wind or even against it. If they ground on a shoal, such as that off Joinville Island, melting will before long reduce their draught, and they will again travel onwards, soon to disintegrate in the heavy swells and warmer waters which lie to the north.

We conclude therefore that there were at least four, and probably six, very large bergs in the period concerned.

It appears from the records that no ship has done more than steam along one side. Though it would make a considerable demand on a ship's time, it would be a great advantage if a ship were to take the opportunity of steaming right round one of the big bergs and charting the lengths and relative positions of the different sides. This would be necessary in order to identify one berg with another beyond all possible doubt. Except for the possible case in 1930 there are no records of rate of drift of the very large bergs.

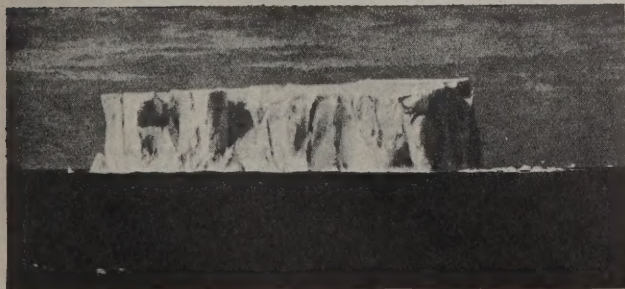
Whalers have worked round South Georgia for nearly thirty years, and it is only in the last few years that large bergs have been reported from this area. In view of the occurrence of the large tabular bergs between 1927 and 1933 it seems necessary therefore to assume that there has been in recent years an unusual break up of barrier ice in the Weddell Sea.

When in 1927 the *Odd I* reported a 90-mile berg it was thought at the time that this probably represented the broken-off Stancomb Wills Promontory from Coats Land. The additional number of large bergs since listed indicates a much more extensive break up in the Weddell Sea, and obviously not confined to the Stancomb Wills Promontory. The place of origin must be either along Coats Land, at the Filchner Barrier, or on the unexplored western side of the Weddell Sea. The Coats Land ice-cliffs rise almost everywhere to high snow mountains, and that portions 20 miles long should break off and form tabular bergs is not considered possible; smaller bergs only are likely to form in view of the crevassed nature of the glaciers. The Filchner Barrier is described as low and about 60 feet in height. In the one case therefore the nature of the ice, and in the other the height, present difficulty in accepting either Coats Land or the eastern portion of the Filchner Barrier as the source of origin. It seems much more likely therefore that the bergs come from the unknown south-west portion of the Weddell Sea, between the Filchner Barrier and North Graham Land.

If, as we conclude, these large bergs have their origin west of the Filchner Barrier, the geographical changes taking place in that region must be of exceptional extent and importance. In the aggregate thousands of square miles of barrier have been removed, and the recession of the ice edge must be extremely rapid. The configuration therefore of this part of the Weddell Sea may have completely altered and produced results which markedly increase the chances of successful penetration into this unknown quarter.

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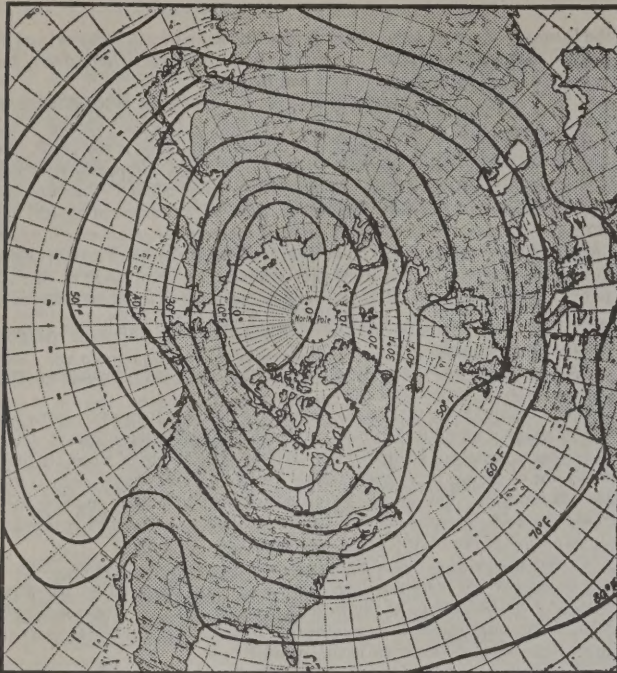
The Geographical Journal, vol. LXXXI no. 5, May 1933



AN ICEBERG IN ROSS SEA.



DANGERS OF THE SOUTH: A BIG 'BERG IN THE SWELL.



Map tracing bands of similar weather in Northern Hemisphere

Why the Upper Air Is Warmer Over the Poles Than It Is Over the Equator

W. P. Keasbey
The Christian Science Monitor

Most of us would agree that the temperature at the earth's surface tends to vary pretty regularly with the latitude, being hottest at the equator and cooling off as you approach the poles. Also, the temperature of the air tends to drop with an increase in altitude, high mountain peaks being noticeably colder than seaside resorts.

A curious fact, however, is disclosed by data obtained by meteorologists from free balloons containing self-recording instruments and sent far above the "ceiling" of all lighter-than-air craft. That fact is that the upper air over the poles is warmer than the upper air over the equator.

At latitude 90 degrees or the pole, the air gets colder and colder as you ascend above the earth's surface up to a point approximately 5 miles straight up. At the

ARMY 'DEGREE DAY' MAPS

Indicate Heating Needs in All Parts of World

The climatology unit of the Quartermaster Corps has compiled a series of "degree day" maps covering the entire world on which heating fuel requirements for the Army anywhere on earth can be estimated easily and accurately, the War Department has announced.

A "degree day" is a unit used by heating engineers in calculating fuel requirements, and it is customary to consider that fuel will be needed when the temperature is below 65 degrees Fahrenheit. In arriving at the "degree day" unit, the average temperature for each day below 65 degrees is subtracted from that figure and the total of all such days are added to obtain the number of degree days in a year.

If, for instance, the average temperature for March is 50 de-

grees, the number of degree days in the month will be thirty-one days times 15 degrees, the difference between the average temperature and the arbitrary figure of 65 degrees, or 465 degree days.

Areas which have cool spring, summer and autumn weather, such as England, have higher degree day values and more fuel is required than in those having colder winters but warm spring and fall seasons. Fort Conger, Ellsmere Land, at the top of the North American continent, has the highest number of degree days, with 24,000 a year, while Verkoyansk, Siberia, the coldest spot on earth, has 22,500.

Washington has 4,600 degree days a year, while New York, with 5,500, is about the same as London, which has much warmer winters. As a winter resort, Miami takes first place over Los Angeles with only 187 degree days, against 1,370.

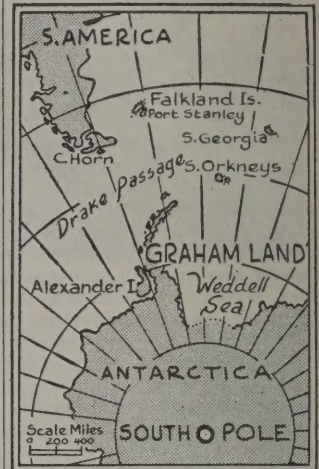
British Antarctic Expedition To Examine Grahamland Area

LONDON, April 23—The Boy Scout of 18, who accompanied Sir Ernest Shackleton's last voyage in the Quest—now Lieut. Comdr. J. W. S. Marr of the Royal Naval Volunteer Reserve—is back in the Antarctic leading the most secret expedition of discovery ever to leave Britain. He has with him an exploration party of fourteen British scientific and research workers, all volunteers, who have now established a base camp of huts and tents amid the snow and ice near Hope Bay, Grahamland, below the tip of South America.

The explorers will remain in the Antarctic for two years, carrying out intense research into polar meteorology and radio conditions, the mineral wealth of Grahamland, biological and botanical facts, bird movements and the habits of whales, seals and fish.

They will also travel over Grahamland and will visit islands of the South Shetlands, South Orkneys and South Georgia.

Commander Marr, who leads the party, is a veteran polar explorer. After returning from his first expedition with Shackleton he graduated at Aberdeen University. In 1925 he went on an arctic ex-



pedition as assistant biologist. Ten years later he was awarded the Polar Medal and Clasp for services in the Mawson Expedition of 1929-31, and in 1937 he was senior zoologist in Discovery II which went to the antarctic to study the habits of whales. He spent some months in a whaling-ship factory at the beginning of the war.

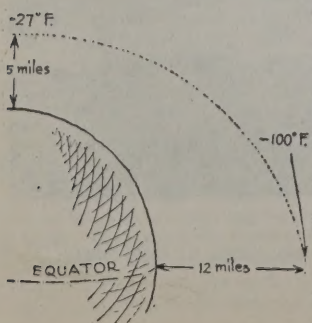
Falkland Provisionals



Provisionals issued for recently created dependencies of South Shetlands, South Orkneys, Grahamland and South Georgia for use until definitive stamps can be produced in London

For the first time in its history, the British Crown Colony of Falkland Islands has overprinted stamps for use in its four dependencies — Graham Land, South Georgia, South Orkneys and South Shetlands. The overprints, report J. & H. Stolow of New York, are on these eight values of the current Falkland Islands set: 1/2, 1, 2, 3, 4, 6, and 9 pence and one shilling. The Falkland Islands are located about 300 miles east of the Straits of Magellan at the southern limit of South America.

latter to the former and a corresponding return. In other words, this inferred upper circulation is the mirror or reversed image of the lower circulation of air in the earth's atmosphere, which becomes heated and rises miles above the earth, spilling over to the north and south and chilling as it travels toward the poles.



Byrd South Polar Expeditions Pay Off

Associates Devote Knowledge to War

By JAMES A. WHITE

WASHINGTON (AP) — The Byrd expeditions to the Antarctic—remember?—are paying off today in the war services of the veterans of polar exploration.

These men constitute this country's only sizable reservoir of knowledge and experience in Arctic problems. When global war brought the necessity of operations in frigid zones, that reservoir was tapped freely.

Rear Adm. Richard E. Byrd led two privately-financed expeditions to south polar regions during the previous decade; in 1939 he headed the United States Antarctic service's expedition.

On this last trip, Byrd had 59 men ashore at the bottom of the world—27 from the Army, Navy, Marine Corps and Coast Guard, and 32 civilians.

Service Men Still Serving

All of the service men still are serving; all have been promoted or upgraded.

Most of the civilians are in uniform, too; all are reported to be contributing specialized work on the problems of combat in cold weather, or on associated subjects.

A few case histories:

Byrd himself has re-entered active service with the Navy and has dropped largely from the news, except for a couple of brief visits home on leave.

Adam Asman, an Army tank driver who was with Byrd at his west base in Antarctica, has had special assignment in the Arctic, testing tanks under conditions of extreme cold.

A Navy cook, Sigmund Gutenko, helped scientists here work out cold weather diets for the armed services. He's now on submarine duty.

Theodore A. Petras, USMC aviator, is pilot of the commanding general of the first Marine Corps Division, which means he flew Gen. A. A. Vandegrift through the Solomons campaign and is now piloting Maj. Gen. William H. Rupertus around the Cape Gloucester theater.

As to the civilians:

Maj. Paul A. Siple, U. S. Army Quartermaster Corps, is a symbol of what this specialized experience has meant.



An Army tank driver who was with Rear Adm. Richard E. Byrd at the west base in Antarctica, Tech. Sgt. Adam Asman is shown here when he received the Legion of Merit Medal from Maj. Gen.

Alvan C. Gillem Jr.

You'll remember him as the Boy Scout who went with Byrd on his first Antarctic expedition back in 1929. Ten years later, he was geographer and leader of Byrd's west base on the Antarctic service expedition.

He has helped the Army design equipment—from socks to sleeping bags—for Arctic operations. His research in the complex field of polar climatic and operating conditions has been of inestimable value, according to Harold Gilmour, recorder and historian of the 1939-41 expedition.

Siple now serves in the Quartermaster Corps' section on "climate and environmental protection," which means he's figuring out how to make men more comfortable and efficient all over the world.

Gilmour is one of the few civilian veterans of the expedition not serving directly in the Army or Navy today. But he has been called in for consultation—with Siple and others—by the Army as special adviser in outlining plans and recommending supplies and men for establishing Army bases in the Arctic.

Five of Byrd's dog drivers and

trainers are doing the same work for the armed services. Dick Moulton, whom Gilmour calls "the best darned dog driver in the country," is an Army sergeant at a dog-training center in the West.

Still Driving Dogs

In dry weather he breaks his dogs to harness pulling an old Austin chassis, the same one he used to train dogs for the Antarctic expedition.

Hendrick Dolleman and Joseph Healey, other dog drivers, have been serving in Greenland, where, with Col. Bernt Balchen, veteran of one of Admiral Byrd's earlier expeditions, they have participated in more than one spectacular rescue of stranded American airmen.

Alton F. Wade, senior scientist on the last expedition, is an officer in the Army's Air Transport Command, serving in Arctic operations.

Arnold Court, Byrd's west base meteorologist, is an Army officer assigned to special cold climate duty.

J. Glenn Dyer, Antarctic surveyor, is on his second stretch of duty with the Army Air Forces as an Arctic surveyor.

Another surveyor, Don Hilton, who doubled as a dog driver in the Antarctic, is with the Seabees somewhere in the Pacific.

All these men and many others, says Gilmour, are contributing technical experience in one way or another. Ernest E. Lockhart, physiologist, is at Massachusetts Institute of Technology, where he has done much confidential work on cold weather diets.

Geologist in Arctic

Geologist Lawrence A. Warner is in the Arctic somewhere with the U. S. Geological Survey.

This does not account for the crews of the expedition ships, the U. S. S. Bear and the U. S. M. S. North Star. Gilmour says that the Bear, which twice made the trip to Antarctica, was assigned to Arctic patrol after she returned in May, 1941, while the North Star was turned over to the coast guard for Arctic duty.

When the full story of what the Byrd expedition veterans have done can be told, says Gilmour, it will show that many lives have been saved because a handful of Americans learned at the South Pole what to wear, what to eat, how to get along in weather which most other Americans knew little or nothing about.

EXPLORER HURT IN CRASH

Former Submarine Captain Injured in Plane at Guadalcanal

GUADALCANAL, March 21 (Delayed) (AP)—Lieut. Comdr. Ike Schlossbach, retired, was injured in an airplane accident on Feb. 10, it was disclosed today.

The 54-year-old former submarine captain, who explored the South Polar seas with Admiral Richard Byrd and who subsequently took Sir Hubert Wilkins into the North Pole region, cracked up while taking off alone in a Navy dive-bomber from Henderson Field. He had been commander of the field since soon after its capture from the Japanese.

His plane did not attain take-off speed and fell into the river at the northwest end of the field. Comdr. Schlossbach fractured six ribs and suffered other injuries. He is reported to be recovering in a Nouméa (New Caledonia) naval hospital.

Eskimos Debate Removal Of Teeth of Sledge Dogs

Seek Way to Keep Animals From Eating Children

MILWAUKEE, Jan. 22 (UP).—A bitter debate in an Eskimo parliamentary session on the question, "Shall the incisor teeth of

sledge dogs be knocked out or be permitted to remain?" was one of the interesting tales brought back by Lieutenant Carl Eklund, Tomahawk, Wis., air intelligence officer, who passed a year in Greenland.

Lieutenant Eklund, who was with the Byrd expedition in 1939-41, explained the strange debate. He related that the ferocious dogs had been eating Eskimo children and frantic parents appealed to have the dogs made harmless. "Of course," added Eklund, "if they did take the teeth out, the lawmakers realized that it would be a lot more work for the owners, who

would have to cut up all the dog's meat." They finally decided to try the plan in one village and report the results.

Seven Nations Agree on Whales

WASHINGTON, June 9. (AP)—The diplomats of seven nations have agreed that one blue whale equals 2½ humpback whales. Likewise one blue is the equivalent of two fin whales or six sei whales. The table of whale values is set down in a protocol signed by the Governments of the United States, Great Britain, South Africa, Australia, Canada, New Zealand and Norway, regulating the taking of whales, as soon as the war ends and the whalers can go back to work.

Russians Build Railroad to Khabarova on Yugor Strait

By Paul Wohl
The Christian Science Monitor

Recently there were opened in Siberia new ports and rail lines over which Allied supplies can reach the U. S. S. R. without approaching the heavily fortified northern tip of Norway where Nazi raiders lurk.

Undaunted by the terrific onslaught of Hitler's armies in 1941 and 1942, the Soviets doggedly have completed a railroad extending about 1,000 miles from their northernmost east-west trunk line between Leninigrad and the Urals to Khabarova on the Yugor Strait. The little fishing port of Khabarova, located at the foot of the northern ramifications of the Urals between the Barents and the Kara Seas, was almost unknown before the war. It gained in importance as the Arctic services of the U. S. S. R. developed in the northern seaway to Siberia.

Warmed by the northern reaches of the Gulf Stream, the roadstead of Khabarova freezes later than the shallow waters of the White Sea.

The sea route to this new railroad passes several hundred miles north of Norway, skirting the southern rim of the pack ice. Thus, Allied convoys have been going through to Khabarova practically unmolested by German raiders. Shipments over this route gained in importance as the Russians increased war production in Siberia.

Khabarova is not only the northern terminal of the new railroad over which Allied supplies can reach the northern sector of the Russian Front; it is also for more than four months during the summer the principal transit port

on the sea route to Novy Port at the mouth of the Ob River and to Port Dickson at the mouth of the Yenisei.

These two mighty Siberian rivers are navigable for many hundreds of miles and extend almost into the heart of the great industrial combine between Kusnetzki in the center of the so-called Kusbas and the industrial area of the Urals.

Shortly before the war the Russians had established a regular shipping line between Igarka, the timber export center on the Yenisei, and Archangel and Murmansk through the Yugor Strait.

As a meteorological observation point for Arctic shipping, Spitsbergen has always interested the Russians. The Spitsbergen coal mines were, up to the war, operated by a subsidiary of the Soviet coal trust under a Norwegian concession. Since the spring of 1942 the island and its air base were held by a Norwegian force.

Whether or not the Spitsbergen airfield was used by the United Nations to escort convoys bound for Khabarova and Siberian ports is not public information. There can be little doubt, however, that the Spitsbergen base, especially in the fall and spring, was of considerable value in aerial navigation through Arctic waters which the Russians developed so effectively all along the northern seaway.

Russia to Explore for Metals

A Soviet home broadcast, reported May 12 by United States Government monitors, said that 272 scientific expeditions, organized by groups affiliated with the Academy of Sciences of the U. S. S. R., would set out in the near future to explore the Urals, the Far East, the republics of Central Asia, the Caucasus and the Far North to investigate the sources of iron, manganese, cobalt, chromium and zinc.

Plane Ferry to Russia Ruled by Arctic Weather

The Christian Science Monitor

FAIRBANKS, Alaska—A lesson in international co-operation for many of the world's adjoining countries to note is being written by Russia, America, and Canada along the Great Circle aerial route over which Lend-Lease airplanes are being ferried to the Soviet air force.

The story of the plane ferrying work has not been revealed in any detail by either Washington or Ottawa sources, but the Alaskan Department of the United States Army and the Wartime Information Board of Canada recently have described the gigantic task of gathering and correlating weather information on which the movements of costly bombers and speedy fighter planes depend.

The story goes back to Wrangell Island's rise into the headlines in 1926 when a Russian gunboat removed a party of Alaskan Eskimos that Carl Lomen of the famous Alaskan "reindeer king" family had established there some years before, and replaced it with a Russian colony. No objections came from Washington, for the value of Wrangell Island at that time was not recognized by this country. Nor did the British, who once had claimed the island, dispute with Moscow over its control.

The United States Army, working with naval and coast guard craft at sea and with United States Weather Bureau stations in major towns of Alaska, has built up a network of observers covering the entire territory, from Point Barrow to Ketchikan. Some of the observers serve through the Bureau of Indian Affairs, a Federal agency; others through the Alaska Bureau of Aeronautics and Com-

munications, which operates dozens of settlement radio stations.

Bureau of Indian Affairs teachers, who serve as lawyers, postmasters, United States commissioners and radio operators in many settlements, also help keep the planes aloft by making regular reports on the weather in their home areas. Through the recently-completed telephone line along the Alaska highway, the data is flashed to the Canadian Department of Transportation station at Whitehorse, British Columbia.

Strangely, different winds make different types of currents along the mountain ranges and one route that is safe today may be dangerous tomorrow because of a mountain-made downdraft. Likewise, the ash from Mt. Veniaminoff, which erupted in 1939, could conceivably cut off flights down the Aleutian chain from existing bases. The whole Aleutian chain, as a matter of fact, is full of volcanoes.

Recently the United States Weather Bureau stations in Alaska have been adding a new piece of equipment, the ceiling light projector, useful at night in determining the height of clouds, hence of the "ceiling." It is a spotlight that throws a beam into the nearest clouds. By triangulation, observers can determine the height of these clouds.

Strangest phenomena to tenderfoot pilots in the northland are the long summer days and the narrow time belts. From May to September over the mainland of Alaska it is night but a few hours, sometimes not at all, because of the midnight sun. And in mid-winter, the sun may come up at 10:30 a. m. and set at 1:30 p. m.

Such Is the Tempo of Igarka

A COASTLINE, snow-blown and icebound in the winter of the polar night, fogbound and moss-grown in the summer of the polar day—that is the coastline of the Siberian Arctic. Until a relatively recent date the Siberian Arctic, which embraces the vast territory of the lower valleys of the Ob, Yenisei, and Lena rivers north of latitude 62 N., and sweeps across the north of Soviet Asia from the Yamal Peninsula to the Chikot headland, was the home only of northern nomads, of the polar bear, the lean plains wolf and the Arctic fox, with civilized man a rare and curious visitor.

After the visits of explorers new names would appear on the arctic map to record some discovery: Bering Strait in honor of Vitus Bering, a Dane in Russian employ; Cape Dezhnev at the northeastern land's end of Asia, named after its Cossack discoverer; Asia's northernmost Cape, Chelyushkin, rounded first by a Russian Baltic midshipman and not visited again for 140 years; the De Long Islands, located by an American, Captain George Washington De Long, and reached by man again after 56 years; Dickson Island, north of the Yenisei estuary,

which takes its name from the Swede Oscar Dickson; and Franz Josef Land. . . .

Then, fifteen years ago, towns began to spring up along the coast at or near the mouths of the Siberian rivers, and the airplane, the radio, and the icebreaker began to open the Arctic to commerce and industry. Permanent polar research centers were established, seas were opened, and ports were built to accommodate ships. The Arctic began to throb with human activity. We have seen it.

We reached the port of Igarka after a six-day steamboat trip down the Yenisei from Krasnoyarsk. The site of the harbor had been chosen because it afforded a convenient place for river craft to transfer cargo to and from ocean-going vessels, which steam up the Yenisei from the Kara Sea, 420 miles to the north. When we arrived, there were eight large transports in the harbor: some from England, one from South Africa, the rest from Scandinavian countries. All had reached Igarka via the Northern Seaway: a week's voyage under icebreaker convoy from Murmansk; eleven days from London.

"Every year, the first glimpse of steamer

smoke waiting across the broad river," said a fellow passenger, a resident of Igarka, "brings us a thrill of joy. For nine months the Arctic is closed by polar ice, and we don't see any big ships. During that time we stock the yards with sawn wood. And then, in early summer, one after the other the ships arrive! What a bustle and stir! Everybody goes down to the quay. . . ."

"The town certainly looks big," we said, admiring the city that sprawled for four miles along the sheltered harbor.

"Yes, but you couldn't get lost in it," laughed the Igarkian. "Nevertheless, it has a population of 20,000, and Dawson City of Klondike fame had, in its heyday, only 10,000 inhabitants. Igarka is the largest town within 300 miles. Yet we're near to everything. We fly!"

That's the tempo of Igarka, a tempo of rapid growth. The first steps to build this port were taken in 1928. The ground was then covered with dwarf trees and tundra bush through which prowled bears, wolves, and polar fox.—From "Soviet Asia," by RAYMOND ARTHUR DAVIES and ANDREW J. STEIGER. (New York: Dial Press.)

Soldiers Test Army's Gear in 'Weather Mill'

Trials Under All Kinds of Climatic Conditions Bring Improvements in Apparel

By Luke Carroll

New York Herald Tribune

LAWRENCE, Mass., March 21.—The Army Quartermaster Corps has established in an old textile mill here a climatic research laboratory, perhaps the only one of its kind, where every item of apparel and shelter used by American soldiers is subjected to extensive tests under the exact weather conditions encountered on every fighting front.

These weather conditions are reproduced in two giant testing chambers where a flick of a switch will start an Arctic blizzard or a tropical deluge.

In the cold chamber—called the "icebox" by the forty-five enlisted men who volunteered to serve as research subjects—the temperature can be lowered to 65 degrees below zero. In the other chamber, called the "sweatbox," the temperature can be raised to 150 degrees and, most important to the Army research specialists conducting the experiments, the dry heat found on an African desert or the humid atmosphere of the jungle can be duplicated.

Each chamber is 64 feet long and 11 feet wide and is equipped with a treadmill on which the volunteers march loaded down with all their gear. The chambers also have apparatus to manufacture wind, rain, snow—even a sandstorm.

For the benefit of visiting newspaper men, the Army demonstrated how the experiments are made and explained the value of the scientific study of the soldiers' comfort.

Before the Army research volunteer enters the chamber, a harness is strapped next to his skin. The harness, technically known as a thermocouple, is dotted with sensitive points connected by wires to a recording machine outside the chamber. This machine enables the experts to record at all times the skin temperature of the soldier making a test and to determine how quickly a soldier's stamina deteriorates under various climatic conditions.

After the harness is strapped on, the soldier enters the chamber carrying all the gear to be tested. Sometimes it is a new lightweight sleeping bag, or a specially designed windproof outer garment or a synthetic rubber poncho or a new kind of footgear.

If it is a sleeping bag, the soldier crawls into it and remains in the "icebox" for several hours under the watchful eyes of research specialists, who check his physical condition and reaction on the recording machine. At the same time the experts and the soldier communicate frequently through a loud-speaker device. During the

A DISCUSSION OF THE WEATHER



Sgt. Wesley Mutte, observer, questioning through a microphone from outside the Arctic room Pfc. George Budden during the testing of wearing apparatus and tents under extreme temperatures. The experiment is being conducted at the Climatic Research Laboratory of the United States Army Quartermasters Corps at Lawrence, Mass., to determine how best to prepare troops to endure the various climates into which they will be sent.

test the temperature is raised and lowered, the wind machine turned on and heavy snow falls.

If a new style shoe is to be tested, the soldier marches for hours on the treadmill, either in the teeth of an Arctic blizzard or in the torrid heat of the jungle. To check the shoe in mud and rain, the experts turn on the rain-making apparatus.

So striking have been the findings of the Army Medical Department officers in charge of the laboratory that the outfits now issued to soldiers are radically different from those issued at the outbreak of the war. The American soldier is now the best outfitted and most comfortable fighting man in the history of warfare as a result of the findings of the research laboratory, according to the Quartermaster Corps.

Improvements are made constantly, and the gear is checked against that of captured Germans and Japanese. These captured items, according to tests made here, are inferior in every way to American equipment.

Lieutenant Colonel John H. Talbott, who was with the Harvard University Research Laboratory until he was placed in command of the Climatic Research Laboratory, said this improvement in American gear represents a major military triumph, since the United States at the outbreak of the war had made little progress in the

New Waterproof Match Ready for Service Men

WASHINGTON, June 15—A waterproof match which will give a fighting man a light in fair weather or foul, in tropical jungles and in Arctic cold, has been developed by manufacturers, the War Production Board stated today.

The new match should prove especially valuable, the WPB said, to service men in jungle areas where ordinary matches are frequently made useless by climatic conditions.

Laboratory studies indicate that the match will withstand immersion in water for a longer period than any of the types of water-resistant matches produced so far.

science of outfitting its soldiers.

One of the first problems to confront the research experts was footgear. The war had barely started when complaints came back from the South Pacific that the nails rusted, the stitching rotted and the leather became spongy. As a result of tests made here a new jungle boot was developed, much lighter and made mostly of rubber with built-in rubber cleats to prevent slipping.

A counterpart of the jungle boot is the specially insulated shoe now issued to soldiers fighting in cold climates. Thousands of these shoes are now being worn by Russian soldiers.

Results of the tests and experiments are made available to all the United Nations, and experts from Great Britain, Russia and other countries come here to study latest developments and to supply information on weather conditions of their countries.

The great steps taken in the science of providing protection against the elements will be reflected in the clothing of civilians as soon as the war is over and the data of the laboratory are given to private industry, laboratory officials said.

Colonel Talbott predicted that civilian clothes will undergo a drastic change. Styles may remain the same, he said, but fabrics and the physical properties of clothing will be overhauled. As an illustration, he pointed to the light outer coat, with windproof shell and insulation of alpaca or other fibrous material, which replaced the Army's old heavy woolen overcoat. Not only will the civilian overcoat disappear, he said, but heavy winter blankets will be replaced by lightweight materials similar to those now used in the Army's sleeping bags.

Canol Oil Refinery Is Opened; \$130,000,000 Work Aids Alaska

By The Associated Press.

WHITEHORSE, Yukon Territory, April 30—Canol, the \$130,000,000 American-financed oil project in northern Canada, is ready to begin delivering fuel for the Allied war machine.

Before Canadian and American officials, the Whitehorse refinery, linked by 595 miles of four-inch, above-ground pipeline to the oil source at Fort Norman, Northwest Territory, was opened officially today.

Completion of the project, which ranks with the 1,523-mile Alaskan highway as one of the great engineering feats in Canada's war-opened northwest, was the culmination of twenty-two months of work by thousands of Canadians and Americans.

Prime Minister W. L. Mackenzie King, in a message, said:

"Canol stands as one more example of United States-Canadian cooperation."

The project, he stated, "was undertaken as an emergency measure when enemy action threatened the lines of supply to United States forces in Alaska."

His message was to Brig. Gen. Ludson D. Worsham, commanding general of the Northwest Service Command, who was responsible for construction of the project. It was read at the ceremonies by Maj. Gen. W. W. Foster, Special Commissioner for Defense Projects in northwest Canada, who represented the Canadian Government.

The project includes a 1,500-mile network of pipelines for distribution of the refined products, a power plant dismantled and shipped from Hamilton, Ont., pump stations and storage tanks.

Work in the Fort Norman field started June 29, 1942, two days after the United States Government had proposed development of the area to Canadian authorities. The pipeline crosses the Arctic Continental Divide.

The refinery will furnish aviation fuel for planes using the series of airfields between Edmonton and Fairbanks, Alaska, gasoline for trucks and army equipment rolling over the Alaska highway and Diesel fuel for use in tractors and similar equipment.

Ownership of the pipeline will be retained by the United States until the end of the war, when it will be offered for sale, with the Canadian Government having the first right to purchase.

WASHINGTON, May 5—A revised agreement among the War Department, the Canadian Government and the Imperial Oil Company will reduce the cost to the United States of crude oil from the Canol project in northwestern Canada from \$1.25 a barrel plus pro-

duction costs to 20 cents, plus such costs, it was announced today.

It provides for future deliveries to the United States of up to 60,000,000 barrels of oil for military use. If the maximum figure were to be delivered, the reduced price would mean a total saving of \$63,000,000 to the War Department.

The War Department itself will not seek further oil reserves in the Canadian Northwest, but Imperial Oil will continue exploration. It will also develop the proved Norman Wells field to assure 4,000 barrels a day for the Army's refinery at White Horse, Yukon Territory, which began operations on April 30.

The agreement provides that after the war is over the United States shall have the continuing right to obtain for its use one-half of the remaining oil reserve of the proved Norman Wells field up to 30,000,000 barrels, and the right to purchase 10 per cent of the oil in any fields discovered by the company in the region until a total of 60,000,000 barrels from the two sources has been acquired.

Canada Eager for Help Of U. S. in Canol Region

A project which was started in the Canadian Northwest as a strategic undertaking, born of war exigencies, is becoming one of great post-war economic potentialities, Charles Camsell, Deputy Minister of the Canadian Department of Mines and Resources and Dominion Commissioner of the Northwest Territories, told the New York section of the American Institute of Mining and Metallurgical Engineers at a meeting at the Mining Club.

American war activities in construction of the Alcan Highway and the much-disputed Canol project have opened the finest virgin region left on this continent, Mr. Camsell said, and the Dominion is eager to have the United States participate in the development of that area to their mutual benefit.

Outlining the region's possibilities, Mr. Camsell said there is oil in the Mackenzie River valley. It has become a practical reality through the Canol project and the pipe line to Whitehorse, in the Alaska Yukon area. He predicted further development would prove that territory to be one of the greatest oil fields on this continent.

Rich gold strikes have been made in the Yellowknife region, according to Mr. Camsell, and five mines have been established there. Other resources of the Northwest territory, he said, include lead, zinc, coal, silver, tin, tungsten, timber and such rare minerals as beryllium and lithium.

Ultimately Mr. Camsell visualized a great agricultural and population development in the territory, pointing out that Canada's experience has been that "mining is the spearhead of economic growth."

CANADA TO REPAY U. S. FOR AIR ROUTES

Will Carry Cost of Permanent
Construction and Improve-
ments in Northwest

OTTAWA, Feb. 29—Canada has paid for all the work done on the chain of airdromes and intermediary fields on the Northwest staging route from Edmonton to Alaska and the route on Canadian property, C. D. Howe, Minister of Munitions, announced in the House of Commons today. The United States will be reimbursed for its expenditures on construction of a permanent nature on all air routes in the Northwest district.

The northwest route, Mr. Howe explained, was developed by Canada and the airway from Edmonton to Whitehorse was usable by daylight three months before the United States entered the war. This facilitated the construction of the Alaska Highway. The United States asked for additional landing strips and permanent works which it was agreed that they should pay for in so far as they were above Canadian standards and requirements.

The decision to pay for all permanent improvements applies also to the flying fields and strips on the Mackenzie River route and elsewhere in northwest Canada. The total cost of the Alaska staging route will be about \$46,000,000 and of all the airways development about \$58,500,000.

The route, Mr. Howe said, was the main artery for air traffic between the United States and Alaska and beyond Alaska to northeastern Asia, and it now had airdromes, hangars and communication facilities suitable to accommodate the maximum amount of traffic that could be foreseen at this time.

"In arranging for the post-war use of the Northwest staging route, the Government of Canada," Mr.

Howe added, "will pursue a liberal policy of cooperation with other nations. We hope the right to use the route will become part of a general scheme of international cooperation in air-transport matters which will provide greater freedom of movement of aircraft and of air traffic within a suitable international framework."

ARMY FINISHES PHONE LINE

Edmonton-Fairbanks 2,600-Mile
System Built by U. S. Group

EDMONTON, Canada, March 10 (U.P.)—The final strands in a 2,600-mile telephone system installed in Canada and Alaska by the United States Army have been joined in the 595-mile circuit from Norman Wells to Whitehorse, Brig. Gen. Ludson D. Worsham, commanding general of the Northwest Service Command, announced today.

The oil wells of the Canol project are at Norman Wells. The refinery is at Whitehorse. The pipeline from the wells to the refinery has been completed.

The completed telephone system extends from Edmonton to Fairbank. It is now possible for officials in Washington to talk directly with men at any of the Northwest Service Command installations.

HAILS PROSPECTS IN CANOL

Kansas Geologist Says Stores of
Oil Appear 'Limitless'

TOPEKA, Kan., Jan. 1 (P)—Prof. Lowell R. Laudon, head of the University of Kansas geology department, described today what he termed "apparently limitless" possibilities for oil development in the Canol area in the Mackenzie River basin in Canada.

"We found oil reservoirs 100 times as big as we first thought prevailed in the northern area," said the geologist, who worked for the Imperial Oil Company last summer and did exploratory work on the Canol project of the United States Army.

"Drilling is cheap there," Professor Laudon said in an interview. "Oil is found close to the ground and there have been no dry holes to my knowledge. Transportation is the big cost."

Unrationed Inch-Thick Steaks Are Plentiful 'Way Up North'

EDMONTON, Alta., Jan. 25 (Canadian Press)—Stan Pepper is out of the Far North today on his annual two-month business trip—and if the jaunt weren't urgent he would take the next plane back to his paradise of plenty at Aklavik, Northwest Territories.

Mr. Pepper, United States-born fur trader, general store proprietor and owner of a sawmill, hotel, theater and restaurant in that outpost 2,000 miles northwest of Edmonton, sat in his hotel suite and painted a picture of life in Aklavik:

There are inch-thick steaks, mounds of butter, jams, fresh canned fruit and other delicacies. "We have priorities," he said. "Ottawa grants us all releases on

rationed articles, and we sell a year's provisions at a time to trappers and Eskimos. Rationing wouldn't work very well up north. It would be tough for a trapper or Eskimo on his annual visit to our post to receive only a month's provisions."

Aklavik has a population of about 800 to 1,000 whites, Eskimos and natives (Leacheau Indians). Crime is practically non-existent. Every house and cabin has at least one radio. Weekly dances, with a six-piece Eskimo band that can play either jazz or old-time square-dance music, are held in the Community Hall, and the theater shows comparatively up-to-date pictures.

VAST WEALTH TAPPED IN PACIFIC NORTHWEST

Security Also Assured by Alaska Highway and Air Routes

Solid economic potentialities of the Pacific Northwest have been made available by the new Alaska Highway, built by Americans, and bases for the air route it parallels and services, built by Canadians. This vast area comprises Alaska, the Yukon, Mackenzie River Valley, Northern British Columbia and Alberta.

The North Pacific Planning Project, writes W. L. Morton of the University of Manitoba in the Far Eastern Survey, is a striking example of international cooperation and of ordinary common sense.

The highway was an assurance of the security of Alaska against an Asiatic power; the defense of Alaska was an assurance of the safety of Canada.

As an air route, the future of the Northwest is assured. Over it lie the Great Circle or near Great Circle routes, and the economic routes between the densely populated regions of Asia and North America.

As to its natural resources, the gold of Yellowknife, the radium of Great Bear Lake, the oil of Fort Norman are already well known. The mercury mines of northern British Columbia are notable, already producing a surplus for export. There are the long-known and still practically unexploited "tar sands" of the Athabaska region, a potentially enormous source of oil. The Dominion Government is financing experiments to solve the intricate problems of extraction. There are also long-known and unexploited coal seams in the Mackenzie Valley.

How much other wealth lies hidden in the region future discoveries will reveal.

Freuchen, Explorer, Escapes From Denmark

Stockholm, March 11 (A. P.). Peter Freuchen, Danish polar explorer and author, escaped from Denmark to Sweden yesterday, a Malmoe dispatch to the newspaper Allehanda said today.

Freuchen's home was searched by the Gestapo five days ago. The explorer was the director of several Hollywood productions, including "Eskimo."

U. S. Airmen in Canada Train Parachute Dogs

Animals Will Help to Rescue Flyers in Far North Wilds

HEADQUARTERS, ALASKAN WING, AIR TRANSPORT COMMAND, UNITED STATES ARMY AIR FORCES, May 20 (CP).—Parachute dogs, believed the first in Canada, are tumbling to earth these days in the Fort Nelson, B. C., region, about 550 miles northwest of Edmonton. The "parapooches," too, are taking the leaps in their stride.

The dogs, used as the latest

Planes Drop Pack Dogs to Aid Flyers Down in Wilderness



Siberian huskies training on an Army plane in British Columbia, equipped with food and medical equipment for airmen who have bailed out in wilderness. Leaping with the dogs is a flight surgeon, in background, who wears a mask to protect his face if he lands in tangled brush



A dog of the Alaskan Wing, Search and Rescue Unit, during a practice leap near Fort Nelson

means of rescuing flyers in the far northern wilds, are trained by the search and rescue unit of the Alaskan wing under direction of Major Joseph F. Westover, of Winnetka, Ill., who commands the Canadian sector of the unit. Major Westover's unit equipment is at the disposal of the R. C. A. F.

DR. TOWNSEND DIES; AQUARIUM EX-HEAD

Noted Naturalist, Zoologist
Was Director Here 35 Years
—Authority on Arctic

MIAMI, Fla., Jan. 28 (AP)—Dr. Charles Haskins Townsend, naturalist and zoological authority and for thirty-five years director of the New York Aquarium, died here today at the age of 85.

He was a member of the Arctic expedition aboard the U.S.S. Corwin in 1885; then served as a member of the Bering Fur Seal Commission. He was resident naturalist aboard the U.S.S. Albatross for ten years thereafter.

Dr. Townsend, a Russo-American arbiter at The Hague in 1902, wrote authoritatively on Arctic subjects and general zoology, and was an ex-president of the American Fishing Society.

Dr. Townsend was born at Parnassus, Pa., a son of the Rev. D. W. Townsend and Elizabeth Kier Townsend. He had a public school education, but in 1909, years after achieving success in his career, he received an honorary degree of Doctor of Science at Washington and Jefferson College.

He became an assistant in salmon propagation to the United States Fish Commission in California in 1883, and went on his first expedition in search of strange ichthyological specimens on board the Corwin in 1885. This was followed by many other such tasks, particularly when he became resident naturalist on board the Albatross.

From 1897-1902, when he went to the Aquarium, he was a division chief of the United States Fish Commission. In the latter year during the negotiations between the United States and Russia over the Bering Sea fishing question, he was one of the experts for this Government.

Dr. Townsend took over as director of the Aquarium when it was transferred to the care of the New York Zoological Society. He immediately started improving conditions.

Saved Alaskan Reindeer

He was an authority on hundreds of varieties of water life from the 200-pound giant turtles of the Galapagos Islands, whose habits he had personally studied and written about, to the tiny lung-fish of Lake Victoria Nyanza, which mummified themselves in mud.

He was credited with having saved three varieties of rare animals from extinction. For six years he had studied the fur seals of the Pribiloff Islands in the Bering Sea, and as a result of this work the International Sea Fur Seal Convention was signed to protect the beasts. He found that the native Alaskan reindeer had been destroyed there since the importation of firearms, and re-established the breed by bringing others from Siberia. The last animal he saved was the Galapagos turtle, colonies of which he established in Hawaii, California and the Gulf of Mexico.

Dr. William E. Hughes, Ex-Aid of Admiral Peary

Philadelphia Physician Made
Arctic Trip as Ornithologist

PHILADELPHIA, March 19.—Dr. William Ellery Hughes, a physician for more than sixty years in Philadelphia, died Thursday at his home here. He was eighty-six years old.

Dr. Hughes was consulting physician to the Philadelphia General, Misericordia and Presbyterian Hospitals, and still maintained a private practice at his death. He was believed to have treated more doctors and doctors' families than any other Philadelphia physician. One of his many hobbies was ornithology, and as an ornithologist he accompanied Admiral Robert E. Peary, discoverer of the North Pole, on an Arctic expedition about 1891.

Surviving are his wife, Mrs. Sallie Hileman Hughes; three daughters, Mrs. Lauren Arnold, of Westport, Conn.; Mrs. E. C. Metz, of Washington, and Miss Esther McClure Hughes, and three grandchildren, Lieutenant William H. Arnold, of the Army Air Forces; Miss Dalton Arnold, a student at Vassar College, and Mrs. Samuel Biddle, wife of the Naval Attache at the American Embassy in Mexico City.

Dr. Jesse D. Figgins

Had Served on Staff of American
Museum of Natural History

LEXINGTON, Ky., June 11 (AP)—Dr. Jesse Dade Figgins, archaeologist, died at his home here last night. He was seventy-six years old.

Was On Peary Expeditions

Dr. Figgins became associated with the American Museum of Natural History in New York in 1897, where he specialized in phases of exhibition and took part in a number of field expeditions. Previously, he served as a naturalist with the sixth and seventh R. E. Peary expeditions to North Greenland.

In 1910 Dr. Figgins was made director of the Colorado Museum of Natural History and held that post until 1936 when he became associated with the Bernheim Foundation Museum, at Louisville, Ky. He recently completed a monograph on birds of Kentucky, and was the author of a number of archaeological papers.

CAPT. GEORGE F. STEELE

Master Mariner Was With Byrd's
Arctic Expedition in 1925

BOSTON, May 30 (AP)—Capt. George F. Steele, master mariner and captain of the S. S. Perry, which carried Donald B. MacMillan and Admiral Richard E. Byrd on their 1925 Arctic expedition, died today at the United States Marine Hospital after an illness of four months. He was 69 years old.

Born in Cape Breton, N. S., he came to Boston as a young man to

ADMIRAL REYNOLDS OF COAST GUARD, 84

Former Commandant Is Dead
in Baltimore — Planted the
U.S. Flag on Wrangel Island

Special to THE NEW YORK TIMES.

BALTIMORE, Jan. 25—Vice Admiral William Reynolds, former commandant of the Coast Guard, who, on Aug. 12, 1881, planted the American flag on Wrangel Island in the Arctic Ocean and took possession of it in the name of the United States, died here today in the Marine Hospital after an illness of two years. His age was 84. He was the first Coast Guardsman to be named a vice admiral, receiving the commission in 1923.

Born in Montgomery County, Md., he began his seafaring career in 1878 when appointed as a cadet to the Revenue Cutter Service, the former name for the Coast Guard. From that time until his retirement, forty-six years later, he served on all the United States continental coasts and fought in two wars.

He was a lieutenant in command of a cutter during the Spanish-American War and a captain in the first World War. During the early part of this century he was granted special leave to attend courses at the Naval War College, Newport, R. I.; Cornell University and the Georgetown University Law School. Georgetown awarded him his bachelor's degree in 1902 and master's degree a year later.

For four years he served in the waters of southeastern Alaska, the Bering Sea and the Arctic Ocean, navigating many uncharted courses.

At the time of the Wrangel Island incident Admiral Reynolds was a lieutenant on the revenue cutter Corwin, which had been sent to search Arctic waters for traces of the crew of the polar exploring ship Jeannette. He went ashore with a boat's crew, searched the island in vain for two hours, and before returning to the ship fixed the flag on its staff firmly between boulders, and conducted a brief ceremony. The Jeannette, in command of George Washington De Long, had been caught in the polar ice-pack in September, 1879. She drifted helplessly until June, 1881, when she was crushed and sunk. The members of the expedition were lost, although De Long succeeded in reaching the mouth of the Lena River in one of the ship's boats, only to die of starvation.

Admiral Reynolds had commanded the Itasca, the first steam training vessel, and was head of the cutter school of instruction at Arundel Cove here for five years and for some time was head of the Bureau of Construction and Repairs, with offices in the Customs House here.

Admiral Reynolds was married twice. There is only one survivor, a nephew living in Nyack, N. Y.

Follow his sea career. During the first World War he served with the United States Shipping Board and emerged from retirement in the present conflict to command a Liberty ship until last fall.

IS REAL 'SKY PILOT'

Alaska Pastor Ranges Diocese
in His Own Plane

"Sky pilot" in the truest sense of the term is the Rev. H. L. Wood, who flies his own plane to administer to the largest diocese in North America—the Territory of Alaska and that part of Canada drained by the Yukon. Yet he did not learn to fly until he was 53 years old. That was a year ago, a writer in the magazine Pegasus relates.

When he started to spread the gospel in Alaska in 1929 the Seventh Day Adventist mission (headquarters at Juneau) had one church in the whole Territory. Today Pastor Wood has to stop and count them and the number comes up to fifteen, with a hospital in the Matanuska Valley in the interior also under his supervision.

The Alaskan evangelist has covered his vast diocese many times and by every means of transportation—from dog team to plane—setting a goal of visiting each church twice a year, carrying on in addition to the evangelistic service, medical, educational and welfare aid to the people of Alaska.

Shearer Couldn't Dodge Army Records or Sheep

ABILENE, Kan., April 8 (AP)—George Brightbill reckoned without those omniscient Army records when, upon entering service, he thought he was through for a while with his occupation as a sheep shearer.

Serviceman Brightbill was sent to one of the Aleutian Islands where there happened to be 200 sheep left by natives who had fled before the Japanese invasion. They hadn't been sheared for two years. The commanding officer thought this should be rectified, looked over the records of his men and you can guess who drew the job of shearing those 200 sheep with old-fashioned hand clippers.

Peary Medal Contest Mapped

WASHINGTON, April 7 (AP)—Leading artists of the country will be invited to submit bids for design of a medal to be awarded to surviving members of Rear Admiral Robert E. Peary's polar expedition as soon as the money is made available to the Navy Department, Representative Warren G. Magnuson, Democrat, of Washington, said today. A bill signed this year by President Roosevelt authorizes use of \$750.

Sought North Pole With Peary

PORTLAND, Ore., March 22 (AP)—Dr. Louis J. Wolfe, surgeon for the Peary expedition of 1905-6 in search of the North Pole, and a city Health Department official here for twenty-five years, died today at the age of 67.

This expedition was the one that came nearest to the pole until the final one, which reached it in April, 1909.

Nazis in Greenland Periled U. S. Cities, Noted Flier Reports

NEW YORK, Feb. 11 (AP)—The Germans once had an invasion force in Greenland and flew planes within bomber range of North American shores, Col. Bernt Balchen, famed flier, and Corey Ford declare in the current issue of Collier's weekly.

They added that Nazi submarines had been refueled in Greenland.

The authors said Americans, now in control of the island, first discovered the presence of armed German forces when a dog-sled driver was ambushed. They continued:

"You did not know—the facts could not be revealed until now—that the Nazis had actually established a foothold on this side of the Atlantic.

"You did not know, all last year, that their planes were flying within bombing distance of the shores of North America. Their submarines, refueling in Greenland's silent fiords, were striking at will at our convoys to England and Murmansk.

"Their well-equipped weather station, on the Island's undefended east coast, was in daily radio communication with Berlin."

Messrs. Balchen and Ford said weather information from Greenland "enabled the trapped Scharnhorst (German battleship since destroyed in a sea battle) and Gneisenau to slip out of harbor, under cover of heavy fog, and pass unmolested within 15 miles of the Dover Coast."

New Naval District Includes All Alaska

WASHINGTON, April 4 (AP) — Formation of a new naval district comprising Alaska and the Aleutian Islands was announced today by Frank Knox, Secretary of the Navy.

He said the new district, to be called the 17th, will be commanded by Rear Admiral F. E. M. Whiting of Watertown, N. Y.

Temporary headquarters will be at Adak in the Aleutians and an office also will be maintained in Seattle, Wash.

The Polar Times

Published June and December by the
AMERICAN POLAR SOCIETY,
Care American Museum of Natural History,
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New York, N. Y.

AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends
"The Polar Record," published January
and July by the Scott Polar Research
Institute, Cambridge, England.

The American Polar Society was founded
Nov. 29, 1934, to band together all persons
interested in polar exploration. Membership
dues are one dollar a year, which entitles
members to receive THE POLAR TIMES
twice a year.

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Society.



In building air bases on Greenland. Army engineers built the longest road on the island—thirteen miles

Our Base in Greenland Finished; Veterans Tell Here of Vast Task

One of the stirring sagas of the war in far-off places was told for the first time here May 4 at the offices of the North Atlantic Division of the Army Corps of Engineers, coincident with the announcement that the great American base in Greenland had been completed after years of heroic struggle against the Arctic elements.

Big airbases and hangars, complete Army camps and hospitals, and many weather and radio stations are finished and being put to good service in this strategically placed region far to the north, and the men who carried out the tough assignment now are back in the United States for a well-earned rest or for service elsewhere, it was revealed.

The story of their adventure in uncharted frozen wastes, of months without contact with the outside world save by radio, of steady work in temperatures down to 60 below zero, was unfolded by some of the men who helped do the job. Their experiences were made public at the Army Engineers divisional headquarters here, from which the pioneering operations were directed.

This "invasion of the Arctic" was carried out by hundreds of Army engineers and sturdy workmen employed by civilian contractors. Never before had such large numbers of men ventured into this forbidding and largely unsurveyed territory.

On April 9, 1941, a year to the day from the time the Germans marched into Denmark, the first contingent of the Americans landed

among the fiords of Greenland. In addition to the natural hazards, they faced for a time the grave possibility that the enemy might spread out his invasion forces to this Arctic land.

Germans already were there with their advance posts, observation camps and installations, but these gradually were eliminated. It was not until last summer, the Army engineers explained, that the last of the known installations was destroyed. But from the beginning the chief obstacles were the cold, the ice and the desolate and mountainous region in which the American force had to work.

The bases now completed in Greenland make that island, the largest in the world, "a vital link in the Great Circle route to Europe and the source of all our weather forecasting for the war we fight in Europe."

With the assistance of the newly formed local government, the joint Army and Navy survey party first selected the sites for the principal air bases and weather and radio stations in the spring and early summer of 1941. Construction was assigned to the Corps of Engineers, and contracts were made with two civilian contracting companies in a joint venture. Men and supplies were landed in September of that year at various points along the rugged shores, so the workmen might be ready to carry on when the winter set in and ice shut them off from the outside world.

Building of the camps and unloading of supplies went forward simultaneously until December,

when the last ships, empty and high in the water, moved out of the icy fiords. Not until late the following spring would any vessels return.

Work went on almost around the clock, in ten-hour shifts, seven days a week, however, and even in the northernmost camp weather caused the loss of only two working days the first winter.

The work was completed in twenty-seven months, and during that time the hardy group of Americans were reported to have completed larger, more durable and probably more buildings in Greenland than the Danes and the Eskimos had built "since time began."

Explorer Tells Veterans of '88 to 'Sleep Storm Out' if They Are Caught Again

The proper technique for avoiding death in a blizzard was described March 11 by Dr. Vilhjalmur Stefansson, Arctic explorer, to 250 members and guests at the fifteenth annual luncheon of The Blizzard Men of 1888, held at the Hotel Pennsylvania in commemoration of the record snowstorm that assailed the city fifty-six years ago.

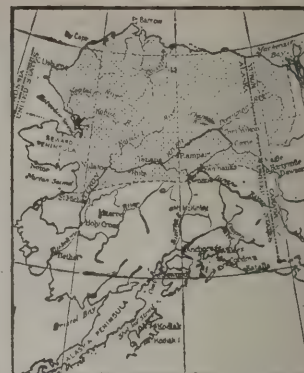
"Do not believe in the saying that if you go to sleep in a blizzard you will never wake up," Dr. Stefansson advised the members, both men and women. To the contrary, sleep is the solution, he said.

Dr. Stefansson said the Eskimos sleep in a sitting position, with their backs to the wind, and, if awakened, stimulate the circulation and then go back to sleep. "It is best to do as the Eskimos do," he said. "Sleep the storm out."

Alaska Wilderness Where Army Map Makers Are at Work



Typical of the 25,000 aerial photographs taken by Army Air Forces from which Geological Survey of Department of Interior is making a new map of northern Alaska, largest single map adjustment in history



Department of Interior
Shaded portion of map indicates 292,000-square-mile area being charted by Army Air Forces and Geological Survey of Department of Interior for military purposes.

North Alaska Yields Its Secrets After Survey by Aerial Mappers

Flying Cartographers' Pictures Soon to Emerge as First Detailed Chart of District, Largest Ever Covered as a Single Unit

Washington, April 22.—Northern Alaska, last American frontier and possible post-war bonanza of untold mineral resources, is beginning to yield some of its enigmatic secrets to the modern flying map makers of the Army Air Forces and the geological survey, according to a report today to Harold L. Ickes, Secretary of the Interior, by William Embry Wrather, director of the survey.

The northern Alaska mapping job, surveying the largest area ever mapped and fixed in geographic position as a single unit, is part of the joint photographic Tri-Metrogon aerial mapping program of the Army Air Forces and the geological survey initiated in 1941. Since then this modern counterpart of the Lewis and Clark Expedition has mapped more than 5,000,000 square miles of the earth's surface in various parts of the world for war purposes. But instead of trudging laboriously through primeval forests and over desert wastes, these present-day aerial map makers have done their field work in Flying Fortresses and Liberator bombers, each capable of photographing 20,000 square miles of terrain in three hours.

The northern Alaska map, now nearing completion, will cover approximately 292,000 square miles, four-fifths of which previously

had been virtually unmapped. This is as much as the combined areas of all the New England states plus New York, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, Virginia and Tennessee. It includes the area extending from the mouth of the Mackenzie River, in Canada, westward to the Arctic water separating Alaska and Siberia, southward to Fairbanks and northward to Point Barrow.

To provide the survey's map-making experts the necessary "raw materials" the Army Air Forces flyers, using planes specially equipped with Tri-Metrogon cameras, took approximately 25,000 photographs. Laid edge to edge the photographs themselves would extend over a quarter of an acre of ground.

Tri-Metrogon mapping from aerial photographs is a highly intricate and scientific process. It provides maps of adequate detail with many times the speed required by previously available methods. While the old and slower method can provide a greater

amount of detail, the Tri-Metrogon system affords many advantages.

From taking the original photographs to the final product there are several stages, each requiring the most exacting application of scientific instruments in the hands of experienced technicians. Some of these instruments have had to be originated and developed by scientists of the Geological Survey and the A. A. F. before the job could be done.

The photographs for mapping purposes are taken with three wide-angle cameras mounted in a plane so that three simultaneous exposures on 9 inch x 12 inch negatives can be snapped covering an area from one horizon to the other. The central camera is pointed vertically downward and the other two are pointed obliquely right and left so that the respective horizons will show at the upper edges. Successive exposures are taken along the line of flight with enough overlap to satisfy stereoscopic requirements and insure continuity over the whole terrain. Parallel flights are spaced approximately twenty-five miles apart.



So untouched is northern Alaska that this fifty-mile-long glacier hasn't even been named.

FALLEN U. S. FLIER 84 DAYS IN ARCTIC

**Lieutenant Brings First Word
of His Bomber, Missing With
Five Men Since Dec. 21**

FAIRBANKS, Alaska, March 16 (Canadian Press)—First Lieut. Leon Crane, 24, of Philadelphia, reached this far northern town today after eighty-four days in the sub-Arctic wilds and brought with him first word of the fate of a United States bomber missing with five men aboard since Dec. 21.

The other four, still missing, are: Second Lieut. Harold E. Hoskins, pilot, of Houlton, Me.

First Lieut. James B. Sibert, technician, of 237 East Thirtieth Street, Norfolk, Va.

Master Sgt. Richard L. Pompeo, crew chief, of Mount Holly Springs, Pa.

SOLDIERS AID ESKIMOS TO HARPOON A WHALE

**Complain Basic Training Did
Not Include Arctic Hunting**

HEADQUARTERS, ALASKA DEFENSE COMMAND (UP)—Sgt. James Turpin, St. Joseph, Mo., would like to record the mild complaint that when he received his basic training nobody gave him any instruction in the art of hunting whale, seal, walrus and polar bear.

Because during his tour of duty in Alaska Sergeant Turpin has found it very necessary to know how to stalk and kill the animals, his complaint is that he had to learn the hard way, on the primitive basis of no kill, no eat. There were periods at first he says reminiscently, when he didn't eat so often.

Sergeant Turpin has just returned from remote St. Lawrence Island, in the middle of Bering Strait, where with four privates he spent five months on outpost duty.

While living with the St. Lawrence Eskimos the five soldiers ate native fare and took part in all local activities such as hunting, fishing and reindeer herding. On one occasion, when a large whale was sighted between the island and the Siberian mainland, they went out in skin boats with the whale killers and assisted in the spectacular business of slaying the giant creature and towing the carcass back to Gambell village.

"Old Benbooshook, the chief, shot the whale with a bomb-tipped projectile and then we all closed in and speared it," Turpin said. "There were skin boats filled with hunters and we soon had so many lances, with floats attached, into the whale that it couldn't sound and stay down."

Staff Sgt. Ralph S. Wenz, assistant crew chief, of Pinedale, Wyo.

Their families were notified of their disappearance soon after the plane failed to return. They were members of the United States Air Transport Command.

Crane said some of them bailed out of the Liberator bomber when it went into a spin between 10,000 and 15,000 feet.

The first nine days, he related, he had no food and spent most of the time huddling in the folds of his parachute to keep from freezing to death. Eventually he reached an unoccupied cabin, stocked with food. The temperatures ranged from 30 to 40 below zero.

After living a solitary existence in the Yukon River valley until the first week of March he met Albert Ames, a trapper, who guided him to Woodchopper, Alaska, a tiny mining camp, where he waited for arrival of the mail plane piloted by Bob Rice of the Wien Alaska Airlines.

"Bob flew me home to Ladd Field (Fairbanks) and I was sure glad to get back to civilization," he said.

When the plane crashed it was on a propeller test mission. Trouble developed and "Hoskins gave the order for all hands to bail out," Lieutenant Crane said.

"I saw only Sergeant Pompeo's chute open," Crane added. "The ship caught fire at about 5,000 feet and I heard it explode when it hit the ground." He did not see any of his mates after he hit the ground.

SURVIVES ARCTIC CRASH



Lieut. Leon Crane, 24, of Philadelphia, who reached Fairbanks, Alaska, after eighty-four days in the sub-Arctic wilds. He brought the first word of the fate of a United States bomber missing with five men aboard since Dec. 21.

Volcano Erupting On Aleutian Island

ELEVENTH ARMY AIR FORCE HEADQUARTERS, Alaska (AP)—The eruption of Mt. Cleveland, which began June 10 and is still continuing, has prompted the evacuation of an Army installation on Chuginadak Island and possibly has taken one life. The 11th Army Air Force announced this.

Chuginadak Island is in the four mountains group in the Eastern Aleutian area. Eruptions accompanied by severe earthquakes began in full force the afternoon of June 10. Army personnel stationed there reported rocks "as huge as automobiles" belched from the crater over the island.

A rescue party headed by Capt. Donald Drewes, Minneapolis, arrived that night but, while evacuation and recovery of material was going on the following morning, "the entire mountain top blew off." Lava and rock were scattered over the island and the Bering Sea for miles around.

Capt. Drewes said the missing soldier probably was lost in the first hour of the eruption. His companions said he apparently had advanced too close to the volcano and was knocked unconscious or killed by falling rock and his body later covered by lava which had poured down the mountain for three miles when the rescue party left.

A second rescue detachment headed by Lt. Lynn Cunningham, Joliet, Ill., recovered all special equipment on the island.



United States Navy

A Flier's Landmark in the Aleutians

Winging past the snow-capped volcano on Gareloi Island, west of the Adak base, a naval air transport service plane silhouettes itself against an ocean of clouds and fog on its way to Attu, with a cargo of supplies for United States forces on that recaptured outpost. Naval Air Transport, organized five days after Pearl Harbor, now has a staff of 2,500 pilots and groundmen, links five continents.

WHAT OUR TROOPS IN ALASKA WEAR

Their Clothing Designed to
Enable Them to Defy
Blizzards

HEADQUARTERS, ALASKA
DEFENSE COMMAND (P)—So far as clothing and equipment are concerned, no Army on earth can spit in the teeth of a blizzard with more assurance than that of the United States as represented in Alaska.

Consider Joe Doakes, private. His clothing issue begins with wool underwear, in several weights. If Joe is going to spend the Winter in one of the really cold places, say where a thermometer is no good if it won't register 60 below, his underwear is a woolly suit of armor that will practically stand up in the corner by itself. Joe also has as many wool socks as he can handle, enough so that he can, if he likes, wear two or three pairs at a time.

His Winter issue uniform itself is all wool—good wool, not the short-fiber stuff of which most armies make uniforms—and heavy. He has general-issue shoes with an extra rubber sole underneath the leather.

High Leather Boots

He also has high, oiled leather boots that are almost entirely waterproof, overshoes with a half-dozen buckles, and heavy shoe-packs, those rubber-footed, leather-topped combinations without which no Maine man or sourdough feels well dressed.

Joe also has, if he needs them, snowshoes or skis, complete with excellent bindings and good poles.

Joe's gloves are woolen, with cuffs that reach half way to his elbows. He has a soft wool scarf that is 14 inches wide and will wind three times around a size 15 neck without stretching. His caps are several—the usual garrison and field caps, also a knitted affair which comes clear down around his neck with only a hole left for his face.

If that is not enough, he has a sweater which would have delighted grandpa's heart. Its turtle neck will come up far enough to cover everything except the top of Joe's head. And still another cap is a quilted affair with fur-lined earmuffs that come down around his chin and even a furred cross-bar to protect Joe's nose. He can hardly breathe in it, but it's warm.

His overcoats and short coats are heavy, his field jacket has a wool lining and his parka has a removable alpaca lining worth somewhat more than its weight in nickels.

The Well-Dressed Airman

If Joe happens to be in the Air Corps and flying, he draws also sheep-lined flying boots (secret: even non-fliers find them the finest kind of cold-weather house boots)

FOR THE MAN WHO WANTS TO BE ALONE



Isolated observation tower set up by Navy Seabees on a remote gale-swept island outpost in the Aleutians. The Navy construction men describe it as "quiet, cozy, private and rent-free to the right tenant."

(U. S. Navy)

with leather and rubber exteriors, fleece-lined flying pants, a natty fleece-lined short flying jacket or, if he knows the supply sergeant especially well, perhaps a long white parka jacket.

Either way, he is not only protected against cold but is so well insulated that he could double for a football tackling dummy without even getting bruised. Fancy white fleece-lined flying mittens complete the outfit.

There are lined waterproof trousers for snow work, rubberized suits for places where it is really wet, dozens of other items for all kinds of conditions.

Sleeping bags are down-filled, double for warmth and with a third waterproof cover for really bad weather.

Practically everything has slide fasteners that can be operated with gloved hands. Sleeves pull tight at the cuffs, collars close around the neck.

For most soldiers Winter in Alaska will mean principally wandering around in the dark.

Joe won't freeze to death this Winter in Alaska, but he's likely to break his neck if he doesn't watch his step.

Air Strips in Canada Revealed

EDMONTON, Alta., May 5 (CP).—Brigadier General L. D. Woreham, commanding general of the Northwest Service Command, revealed today that eight flight

Married Couples Wanted

Jobs Open at U. S. Air Outposts in
Alaska for Thirty Pairs

WASHINGTON, March 9 (P).—The Civil Aeronautics Administration announced today that it wants thirty married couples who are willing to live at remote outposts of the Federal airways in Alaska. Fifty couples, in all, will be hired. Twenty couples are already in training in Seattle for the Alaskan work.

W. P. Plett, supervisor of airways in Alaska, in Washington to recruit the personnel, said the idea of manning the outposts with married couples is prompted by the loneliness of the work. The basic salary is \$1,620 a year for each person, but overtime increases this to about \$2,000. Thus, Mr. Plett explained, a couple could make \$4,000 or more a year, with practically no opportunity to spend the money.

The outposts are used principally to supply weather information to planes operating in the Alaskan area. About 90 per cent of the traffic now is military.

strips to complement the R. C. A. F.'s northwest staging route were completed last winter at a cost of \$2,363,000. The strips, completed in less than six months, are located between Edmonton and Fairbanks, Alaska.

Arctic Safe Route For Aid to Soviet

A statement of the British Admiralty "reveals that in the past six months 1,250,000 tons of war equipment and material were sent by the Arctic route" to the Soviet Union, the British Radio reported.

"More than 98 per cent of these supply ships delivered their cargoes safely," added the broadcast, recorded at the CBS short-wave listening station.

Alaskan Naval Oil Reserve Explored by Geologists

POINT BARROW, Alaska—The 21-year-old Navy petroleum reserve No. 4, set aside as a reserve by former President Warren G. Harding, last Chief Executive to visit Alaska, is being explored this summer by Navy geologists and mining engineers, under a special congressional appropriation.

Lieut. W. T. Foran, U. S. N. R., of San Diego, Calif., a former Standard Oil Company geologist, heads the staff of naval topographers and geologists, assisted by Navy Seabees, who came north of the Arctic circle to check on the many seeps Eskimos have reported through the area of 35,000 square miles which constitutes the reserve.

Shales and sandstones near Cape Simpson, east of Point Barrow, North America's most northern mainland point, are believed to be the most promising of the Arctic coastal rim. U. S. Geological Survey reports indicate seepages covering several acres may be found at various points in this area.

43 Sled Dogs Compose 'Motor Pool' in Nome

NOME, Alaska, Feb. 19 (UP).—The Army's strangest "motor pool" is stationed at this Far North outpost, where forty-three sled dogs are quartered in individual houses, each with its own service record and serial number like every other G. I. Bosses of the canine motor pool, officially known as the Post, Quartermaster Kennels, are Corporal Albert L. Warner, of White Cloud, Mich., who has worked with dog teams for more than two years, and Blackie, a veteran lead dog slated for retirement this winter.

The dogs usually are worked in a team of seven, consisting of the lead dog and—paired off behind him—two swing dogs, two intermediates and two wheel dogs, the latter pair harnessed directly in front of the sled. Most of the Eskimos around here use a "free" lead dog, which travels unharnessed, but the Army hitches up the lead dog so he works with the rest.

Age-Old Mystery of Aurora Borealis Finally to Get Expert Examination

The Christian Science Monitor

FAIRBANKS, Alaska—Up here on the edge of the Arctic, across which part of the world's commerce one day may be flown in giant transports, the Carnegie Institution of Washington is taking steps to examine the physical forces of the north polar regions and the stratosphere.

The aurora borealis, better known as the northern lights, is one phenomenon that natural science doesn't fully understand. So the endowed institution, which has had observers on the campus of the University of Alaska for several years, is adding to its staff and equipment by leasing 250,000 square feet of the campus on which to erect new observatories.

An automatic auroral camera has been equipped to take pictures of the aurora polaris at 2½ minute intervals.

But the aurora is only one of many puzzling problems. From the standpoint of travel-minded American citizens, the most im-

portant involves the matter of navigation in what might be called the zero-zero of aerial operations, the zone nearest the north magnetic pole.

It puzzled two sets of intrepid Russian aviators who came over the ice floes of the Arctic in the late 1930's to land at Vancouver, Washington, and Riverside, California. The magnetic compass just doesn't behave out there.

Carnegie geo-physicists hope to learn more about the "magnetic elements" which are so pronounced from here on north. And since the Arctic is the climate factory for much of the world, they also plan to investigate further into the mysteries of solar-terrestrial phenomena and diurnal and "other cyclic variations" in conditions of the upper atmosphere.

The matter of wave propagation will be given some study. This means that trans-polar travelers may yet be able to receive their favorite radio programs in what is now a blacked-out land for regular radio reception. Too, radio beams for planes might prove important.

A field station and several other facilities are to be erected in the near future. They will consume considerable power, so rights of

Whale Fossil Find Set At 30 Million Years Old

WELLINGTON, New Zealand, March 2—The fossilized bones of a type of whale, which he described at 30,000,000 years old, have been found by Prof. Brian J. Marples in the North Otago region and taken to Dunedin for examination.

Professor Marples made his discovery among rocks of the cliff line near the sea. It consists of the skull and bones of a mammal thirty feet long. These were shifted on a 300-pound plastic block, with the aid of a squad of soldiers, for shipment to the Otago museum. Professor Marples also discovered three skeletons of fossilized penguins of the same period as the whale and a number of bones indicating that they belonged to a penguin standing around sixty inches high and believed to be the largest ever known.

Professor Marples, who is a Professor of Zoology at the Otago University, arrived here from Bristol University, England, in 1936 to take over his present post. Previously he was on the staff of Manchester University.

way for high-tension power and telephone lines have been leased by the university. And three offices and two laboratory rooms are provided without charge by the university in continuance of

the program which began on a co-operative basis.

Stuart L. Seaton, institution staff member, heads the enlarged staff of nine natural scientists.

TO CHECK PRIBILOF HEALTH

Special Medical Mission Will Aid Local Aleutian Doctors

WASHINGTON, June 18 (UP)—Secretary Ickes announced tonight that a medical mission of three members will go early in July for a two-week visit to the Pribilof Islands in the Bering Sea to help local doctors in examining the 400 Aleutian natives who recently were repatriated after a stay of two years in southeastern Alaska.

This mission will include Dr. William A. Morgan, ear, nose and throat specialist; Dr. Roy Lyman Sexton, a specialist in internal medicine, and Dr. R. K. Thompson, dental surgeon, all of Washington, D. C.

Why Eskimos Wed in Haste

BETHEL, Alaska (UP)—When Eskimo couples in Kuskokwim River villages began trekking up-river to be married, and expressed preference for orthodox matrimony, the missionaries concluded their teachings were beginning to have effect. The real reason, however, was that someone had told the Eskimos that if the Japanese landed in Alaska only those persons wearing wedding rings would be spared. Now the rumor has been spiked, and Bethel's marriage mill has taken a slump.

ESKIMOS CALLED TO WAR

Alaskan Villagers, to Last Man, Respond at Once

EAST ALTON, Ill. (NANA)—The story of how war came to an Alaskan village is told by Charles E. Gillham, former Government biologist, explorer and big-game hunter.

It is the story of Hooper Bay, brine-swept little inlet on the Bering Sea. The Japs had attacked Pearl Harbor, were fanning out in all directions. By amateur radio to adjoining Eskimo villages went the word that the men, all men of draft age, must register for service.

The response was an amazing demonstration of loyalty to America. Afoot and by dog-team, wading or swimming the swollen rivers, the silent, sloe-eyed Eskimos streamed into Hooper Bay for registration at the schoolhouse. They said simply:

"We come help Uncle Sam fight Japs. When we start?"

Gillham, now on the game restoration staff of Western Cartridge Company, said registration of the Eskimos was a considerable task. Hardly a half dozen knew their ages. Many with gray hair—and an Eskimo rarely grows gray before 50—blandly told the draft board interpreter they were "about 20."

Finally, two or three to whom names had been given in the mission school were chosen as "gauges." By the use of the mission Eskimos, with older Eskimos as "referees," approximate ages for most were established.

Unable to cope with Eskimo names, Alaskan traders had given some of the registrants English equivalents many years before. Solemnly, they gave these names in registering.

The National Game Heads North



Coast Guard

Baseball in one hand and a glove on the other, a Coast Guardsman does some missionary work for America's national pastime among the natives near his Arctic station

Arctic Air Routes Viewed as Safe For General Travel After the War

One Expert Says Recent Inventions Have Ended Hazards, but Others Say Ice Is Still a Big Problem

As a result of wartime technical advances in the aviation industry the world will see a vast expansion in air travel at the end of the war, with new routes across the Arctic linking many of the large cities of the earth, it was predicted April 5 at the opening session of a three-day national aeronautics meeting of the Society of Automotive Engineers at the Hotel New Yorker.

George A. Bleyle of the Wright Aeronautical Corporation told the conference that "planes are being readied" to fly across Arctic routes between the world's great cities. He added that these routes could be flown safely now with new devices tested to operate at 20 degrees below zero. Ultimately, he said, planes would fly safely in 60 degrees below zero, with engines, starters, fuels and batteries of Arctic types.

To illustrate the vast saving in time and distance of trans-Arctic routes, Mr. Bleyle said that a plane would have to fly only 7,700 miles from New York to Chungking, via the North Pole, compared with 11,700 surface miles via San Francisco and Honolulu. The Arctic route between New York and Moscow is only 4,700 miles, against 5,800 miles via Cherbourg and Berlin, he pointed out.

Personnel must be specially trained for the Arctic routes, while sleeping bags will be as essential as parachutes, Mr. Bleyle added, predicting that the diet of Arctic travelers would include chocolate for energy, muskox, caribou and seal for fat, and rabbit, ptarmigan and fish for variety.

J. E. Gulick of the B. F. Goodrich Company said many hazards caused by the formation of ice on planes flying the Atlantic had been overcome by the development of pneumatic de-icers for the wings of a plane, while slinger rings and feed shoes that supply alcohol to melt ice from the propeller, had also been effective. However, the aviation industry has not yet produced "a complete cure-all" for the aircraft icing problem, he warned.

Lewis A. Rodert of the Ames Aeronautical Laboratory said the public held many false concepts about airplane disasters due to ice. He pointed out that disastrous icing might result from ice in the engine, and that the second most dangerous situation was ice on propellers.

Use of engine exhaust heat as a means of overcoming airplane icing will be the modern trend away from mechanical and chemical expedients in deicing, said Lewis A. Rodert of Ames Aeronautical Laboratory, National Advisory Committee on Aeronautics. In one of two talks on this "bug-

aboo" of commercial air transport operators, Mr. Rodert scouted the popular concept of airplanes loaded with ice crashing to disaster. Actually, he pointed out, icing in the air intake scoop, carburetors, adapters and turning vanes is a far more disastrous form of icing than that on wings or fuselage.

He characterized propeller icing as the second most hazardous form of air icing. Mr. Rodert suggested, however, that commercial flight cancellations are caused less frequently by icing weather than by the limitations of radio communication and instrument landing facilities under such conditions.

Rubber or synthetic rubber de-icing boots have now been perfected for the leading edges of wings. J. E. Gulick of B. F. Goodrich Company, Akron, Ohio, said, which will be able to deice satisfactorily in temperatures lower than 50 degrees below zero. The deicer, furthermore, he said, will combat glaze ice, rime ice, and even "glime" ice, which combines the worst features of the others, even under formation at the rates of one to five inches an hour or one to four inches a minute.

REDS HAIL FUTURE OF POLAR AVIATION

Moscow, May 31 (A. P.).—A writer in Red Star, Soviet Army journal, predicting a "century of polar aviation with communications across the top of the world," left the impression today that collaboration among the United Nations will lead to post-war co-operation in international aerial transportation.

"Great progress is going to be made in the exploitation of northern routes," the writer said. "In this connection, Canada, Norway and Iceland will be of great importance, not to mention the exclusive significance of the northern districts of our country."

"A great role will be played by the Siberian line that connects Europe with the Far East and Pacific coasts. The presence of good will, the increasing military alliance of the United Nations and a stable post-war peace will permit a successful solution of the new and complicated problems of organizing post-war economic life."

A NAVY BOMBER RETURNS TO ITS ALASKAN BASE



Ground crew members waded in icy water to "tow" the plane ashore (U. S. Navy)

North Pole Rejected as Air Lanes Center; Shorter Linking of Vital Areas Predicted

WASHINGTON, June 18—Contrary to the predictions of some aviation prophets of the past, the North Pole is not destined to become the cross-roads of inter-continental air routes, the Brookings Institution stated today.

Trunk air lanes will be developed on the shortest routes between important population and trade areas, it was pointed out, bringing about "a new conception" of geography.

Dr. J. Parker Van Zandt, former consultant to the Civil Aeronautics Board, who conducted the survey, reported that 98 per cent of the world's industry and 94 per cent of its population were concentrated in half of the world, in which the chief air routes would lie.

Stating that this "principal hemisphere" had its center in western France and included Europe, North America, much of

South America, nearly all of Asia and all of Africa, he pointed out that the shortest routes between population centers did not lie over the Pacific Ocean or the North Pole.

"The Transpacific Airway from San Francisco to Shanghai is more than 2,500 miles longer than a route entirely over land," he explained. "The practical problem of costs will dictate the avoidance of long ocean hops wherever possible."

Because air lines, like railroads, must take account of both intermediate and long-haul traffic, he predicted that the main routes from eastern United States to southern Africa or most of Asia would be over Europe.

The most traveled airways were not likely to run "even remotely" parallel with the established steamship routes between major industrial areas, he said.

20-Foot Zipper Bag Used To Carry Army Wounded

New Twin Mattress Designed for Aerial and Arctic Work

WASHINGTON, Feb. 22.—A twenty-foot slide fastener with ten separate sliders, one of the longest zippers ever manufactured, is the fastening device for a new type of sleeping bag, designed and developed by the Quartermaster Corps for evacuation of wounded under conditions of extreme cold

the War Department announced today.

The new bag will be used by Army Air Forces for air evacuation at high altitudes, and by Army ground forces in ambulances operating in Arctic and sub-Arctic areas. It consists of two mattresses held together by a slide fastener. The outside of the bag is water-repellent duck, and the inside of cotton balloon cloth. The mattresses are quilted and stuffed with feathers. The sleeping bag weighs twenty-four pounds, and has six carrying loops.

Where Are the Yanks? In the Bleak Aleutians

Fog, Wind, Sleet, Rain and Blizzards Make Weather Tougher Than Japanese

If the Yanks in the Aleutian Islands wanted to boast, they might say they fought and conquered the Japanese with one hand tied behind them. The "tied" hand was busy battling nature in a war theater that has few equals in physical discomfort.

Virtually every report of action—in the June, 1942, to August, 1943, tug-of-war that followed the Japanese sneak landings at the western tip of the chain—mentioned fog, wind and sleet, driving rain and sudden blizzards.

Stepping Stones to Asia

The Aleutian Islands string out a thousand miles of stepping stone from the Alaska mainland toward northern Asia. Attu, at the end of the line, is farther west of Portland, Ore., than Portland, Ore., is west of Portland, Me.

On a flat map the position of the Aleutians is deceptive. Although they appear far to the north and remote from Pacific centers of power, they actually lie between Japan and the northwestern United States. The American base at Dutch Harbor, near the eastern end of the group, is forty miles south of the shortest possible flight route from Tokio to Seattle.

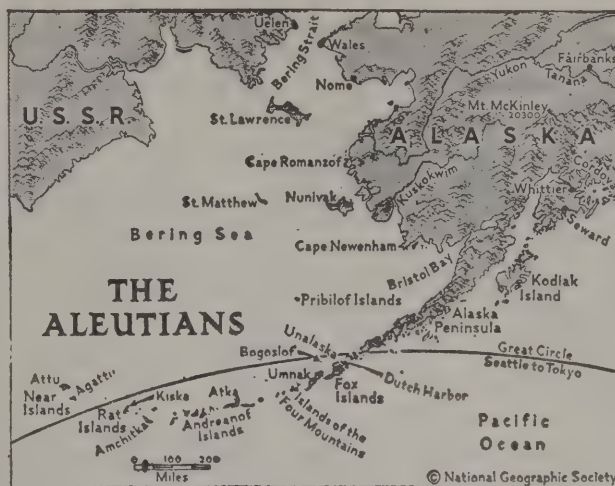
The Aleutian chain made a battlefield that was freakish even among the fantastic fronts of this world-wide conflict. It rises from the sea in five main sets of islands—rugged volcanic formations of fire and ice, contrasting scenes of desolation with green and flowering fields. The group has been called "America's Garden of Fireworks." Behind the mists and fogs that usually obscure the islands is unrolled a panorama which includes active volcanoes crowned by swirling halos of smoke, boiling springs, creased and tumbled lava beds.

Disappearing Islands

Disappearing islands are a curious feature of this turbulent volcanic region. "Jack-in-the-box" Bogoslof has exploded at times into two and even three sections. Once it "blew its top" to throw ashes on settlements sixty miles away.

The Aleutian area is a winter-weather factory where rain, snow and violent storms are "manufactured for export" to Canada and the United States. Cold on the islands is not severe despite the northern location. Their unpleasant dampness and fog result from the meeting of warm ocean currents from the south and the icy waters of the Bering Sea. Especially dreaded is the "williwaw," a sudden, fierce wind that often sweeps out of the coastal mountains with hurricane force. It may wreck planes, capsize ships and scatter piled lumber as if it were match sticks.

Military operations in the Aleutians were complicated by the region's peculiar hazards for sea,



land and air traffic. Naval skirmishes have had to adjourn because of fog. Bombers, timing their blows by careful weather charts, played hide-and-seek with the enemy, as fog and other elements favored first one and then the other side.

Pilots, now on routine patrols, still are plagued with low ceilings and high winds, poisonous gases and tricky air currents that may rise from volcanic craters. Spongy, boggy ground, rolling hills covered with moss and grass, sharp stones, and volcanic-rock splits hamper wheel and foot travel, and call for

steel mats on emergency landing fields. The islands have few good harbors, and ships passing along the shores must always be alert for pinnacle rocks, shoals, hidden islets and rocky ledges, treacherous tide rips and whirlpools.

Before the war, the lonely Aleutians were home to about 1,000 inhabitants. Most of the native Aleuts—swarthy, Russianized relatives of the Alaskan Eskimo—were concentrated on the major islands near the mainland. They lived by fishing, hunting and fox raising. Fine basket weaving added to their incomes.

Residents from the "States" included a few traders, teachers, missionaries and sheep ranchers. The food value of Aleutian grass is indicated by the success of one American-owned ranch, which grazed about 15,000 sheep. A whaling station was operated on one of the islands.

When the Japanese seized Attu, Agattu and Kiska, American authorities evacuated the scattered peace-time inhabitants of the central Aleutians. From the United States came troops and military equipment to strengthen the Dutch Harbor base and set up advance stations in the middle "no-man's-land."

The Army and the Navy have made life as comfortable as possible for men on duty at this, one of the nation's most strategic outposts. In heavy winter clothing, sailors and soldiers in Aleutian service dress alike, keep warm. Behind storm doors, half-barrel-shaped "Quonset huts"—built of corrugated iron and insulated with pressed fiber—make snug quarters. Military bands and at least one battered old piano provide music.

Ancient Relics on Attu

SAN DIEGO, Calif. (AP)—Attu, bleak and barren island outpost in the Aleutians, may become an archaeologist's mecca after the war, according to Lieut. David Kingman. The first Navy chaplain to serve on the island, Lieutenant Kingman reported that hundreds of ivory relics, skeletons and other items had been dug up by the Sea-bees. Many believe entire villages are buried beneath the several feet of tundra which tops the island, he said.



United States Navy

Bleak Aleutian Seascape

A powerful surf pounds the black and shining rocks of Adak in the Aleutians, where United States servicemen keep on the alert for enemy invaders.

Did You Ever Wonder

If the Earth's Geographic Poles Are Stationary as to Location?

Since no one yet has lived at either pole to observe its nature, and since the geographic pole is not visible anyhow, one might reasonably ask how it can be



Dotted line indicates possible wandering of geographic pole over a period of 14 months.

known whether or not the poles are stationary.

The answer to that question is that an astronomer can determine the exact angle between a plumb line and the axis of the earth for the time the observation was made. By making several successive observations of this kind, variations in the direction of the earth's axis may be measured.

It has been discovered that the point where the earth's axis of rotation intersects the surface of the ground (that is, the geographic pole) is not stationary but moves around a variable and irregular curve which could be included in a circle some sixty feet in diameter.

Thus, an explorer wishing to plant his country's flag exactly on the pole would find this feat impossible due to the pole's roving nature, unless he made arrangements for the flag to move accordingly.

If the explorer made his home at the top of the world and made accurate daily determinations of the pole's location, he would note that it moved from one to three inches a day, slowly describing an irregular curve sometimes near and sometimes more distant from a central point. And the pole would finally wander back to the segment of the circle where it started, the time required for the trip being in the neighborhood of fourteen months.

This polar movement was first shown in 1890 through the study of a great mass of astronomical data and calculations made for an entirely different purpose. Ten years later astronomical stations were set up by the International Geodetic Association in various parts of the world, with a view to obtaining more data on the exact path traversed by the poles.

W. P. Keasbey

The Christian Science Monitor

Alaskan Scouts Led Way In Fighting for Aleutians

HEADQUARTERS, Alaskan Department (AP)—You can't bring up the war in the Aleutians here without someone mentioning the Alaskan Scouts. But that's not hard to explain. Scouts led the way.

On the four biggest amphibious operations of the North Pacific campaign—Adak, Amchitka, Attu, and Kiska—it was the Scouts who, in darkness, first paddled ashore from submarines or destroyers or troop transports to stake out landing beaches and locate the enemy.

The Scouts are not supermen. They're especially adapted to their assignment, because most of them are sourdough trappers and miners and fishermen who know how to get around in Alaska and on the Aleutian chain.

Several of them are Eskimos, Indians or Aleuts. A few more are old-line dogfaces with years of service at the Territory's old Chilkoot barracks.

The Alaskan Scouts were born Nov. 19, 1941, at the headquarters of what was then the Alaska Defense Command when Col. Lawrence Vincent Castner, ADC intelligence chief, called a corporal and three privates into his office. He'd obtained authorization to form an Alaskan combat intelligence detachment. "I've picked out you four for a starter," he said.

The men trained 15 hours a day: hardening marches through the snow, sketching and mapmaking, shooting every weapon a man can carry over his shoulder or on his back.

By the time the Japanese tried their sneak into Dutch Harbor, the Scouts, in small detachments, were already working as intelligence reporters in Kodiak, the Pribilofs, the secret bases at Cold Bay and Umnak, and Dutch Harbor.

When we decided to take Adak, two Scout detachments landed on the island, from submarines, at night. Several days later they directed the occupation of Adak by blinker lights from shore with the help of two Navy signalmen and a radio-volunteer.

Before the public back home even knew of the Adak occupation, a detachment was already scouting the next stepping stone, Amchitka.

As soon as the main landing operations there were under way, the Scouts advanced to the tip of Amchitka and established a command post from which they could see Kiska and spot flights of enemy seaplanes.

Seven months later, four scouts, all Alaskans, were the first Yanks to set foot on Kiska.

PRESIDENT APPROVES FUR SEAL LEGISLATION

Agreement With Canada Fixes Shares of Pribilof Island Pelts

WASHINGTON, Feb. 28 (AP)—Legislation giving affect to a provisional fur seal agreement of 1942 between the United States and Canada has been approved by President Roosevelt, the White House said today.

The measure (HR 2924) is designed to protect the fur seals of the Pribilof Islands which have been unprotected on the high seas since Japan's abrogation, in October, 1941, of the convention of 1911 to which the United States, Great Britain, Russia and Japan were parties.

The provisional agreement, implemented by the bill approved today, was entered into by the United States and Canada as a temporary arrangement to protect the rights and interests of the United States and Canada in the fur seal resources of the North Pacific and in the herds of the Pribilof Islands.

Under the agreement, Canada's share of skins taken annually on the Pribilof Islands was increased from 15 to 20 per cent, Canada to receive one third and the United States two thirds of the 15 per cent formerly allotted to Japan. The United States gets 80 per cent.

Alaskan Sealskin Goal Set

WASHINGTON, June 22 (AP)—Between 60,000 and 70,000 Alaska sealskins will be taken this sum-

mer from the Pribilof Islands, where the United States Government owns the largest seal herd in the world. Secretary Ickes said today that last year the record number of 117,000 skins were taken to make up for 1942, when no skins were obtained because of military operations near the islands in the Bering Sea off Alaska. The herd now numbers about 2,750,000 animals.

ALASKA ROADS TO STAY

Canada and United States Take Part in Development

For the United States, Alaska is the last great frontier of vast undeveloped resources and will be its forty-ninth State. For Canada, Alaska is a new opening domain of untapped resources extending from Alberta and British Columbia to the Mackenzie and Yukon in a new, fast-opening Northwest Territory.

For both the United States and Canada alike few regions offer such abundance of unseen tourist wonderlands or unite so many lures for sight-seeing and recreation, points out the survey bureau of the American Express, which tells of the gigantic undertaking of the newly named North Pacific Planning Project.

This project is under the auspices of the Joint Economic Committees of the United States and Canada and the territory is approximately 1,360,000 square miles, more than half of which lies in Canada.

ALASKA HIGHWAY HAS BUS SERVICE

Maintenance of Fairbanks-Dawson Creek Line 1,500 Miles Is Revealed

OTTAWA, Jan. 19—Maintenance crews stationed at short intervals are carrying out sanding and snow-removal operations along the Alaska Highway, enabling the Northwest Service Command to operate a military bus service from Fairbanks to Dawson Creek. This was revealed in a survey of the defense projects in Northwest Canada issued through the Wartime Information Board.

The bus service is carrying military personnel and construction workers 1,500 miles in less than sixty hours driving time. To what extent it will be maintained will depend on the weather.

Details of the board construction which has been done show that at one point the highway rises to 4,350 feet, but the worst of the hazards have been eliminated by banking and grading. The roadbed is usually twelve inches of rock or coarse gravel, surfaced with fine gravel and crushed stone. Seven hundred bridges have been erected, all but fourteen of a permanent kind.

Besides the airfields created by Canada at a cost of \$25,000,000, new installations have been built in cooperation with the United States authorities and along the military highway flight strips have been constructed to provide additional flying facilities for contact flying.

Closely integrated weather-observation posts and forecast stations have been established all over the Northwest by Canadian-American agencies. The Royal Canadian Corps of Signals operates a radio system of eleven stations and radio communication is maintained along the whole length of the chain of airfields. Nearly 2,000 miles of telephone and telegraph lines have been built by the United States between Edmonton and Fairbanks.

The monthly tonnage which has been moved from Skagway to Whitehorse over the White Pass & Yukon Railway, now leased to the United States for war purposes, has been, it is said, almost three times the amount moved in any one season in pre-war days. The railway has been kept open throughout the winter.

Reindeer Draw Russian Supplies

Reindeer are playing an important part for Russia in war on the most northerly sectors of the front. Ideal sites for airfields are furnished by the vast frozen desolate stretches of Arctic tundra behind the lines. All supplies for the air force there—food, fuel and bombs—are carried on sledges drawn by reindeer teams.

Troops Join In Hunt for Seals

HEADQUARTERS, Alaskan Department (UP).—Because of the threat of Japanese attack last Summer against the Pribilof Islands, the greater part of the work of killing and skinning 117,000 fur seals there was carried out by U. S. troops, it was disclosed here.

The troops comprised 60 per cent of the sealing crews, and aided in all phases of the \$7,000,000 fur harvest, from selecting bachelor seals to be pelted to the final task of processing the carcasses for oil and fertilizer. Though none of the men had ever seen a fur seal before, they soon became so expert that a crew of 40 men could kill and skin up to 800 seals an hour, an officer said.

While the Japs did not venture near the island this year, they have visited the Pribilofs many times in the past to poach seals.

Lee Macmillan stated he had taken part in several skirmishes with Jap fur pirates, and there are Pribilof natives who admit having killed at least one boatload of Japs who attempted to take seal pelts.

A move is under way in the territory to obtain a medal for one native who shot it out with a band of Japs and forced them back to sea with their dead and wounded.

Real Mud, This

SOMEWHERE IN ALASKA—"Speaking of temperature extremes in the tropics," noted S/Sgt. Charles G. Livingston who has been working for a year on an obscure stretch of the Alcan highway. "We had a range of from 70 above to 70 below. Transportation in the area was largely by dog sleds, with pack horses and airplanes helping out, until the highway became passible. Even then we had our troubles, particularly when the frost went out of the ground and the mud opened up. I've seen mud deep enough to completely bury a 20-ton caterpillar truck."

Plants in Polar Region

Representatives of Far Northern agricultural institutes and research stations recently attended a conference called by the Soviet Institute of Polar Agriculture and Stockbreeding. Many new plants have been successfully cultivated in the Far North. Sugar beet, flax, tobacco and grain plants have shown that they can thrive there. Potato growing has developed considerably since the outbreak of war. State farms in the Igarka area produced three and one-half tons per acre last year.



Official United States Coast Guard

In the Lee of 'Greenland's Icy Mountains'

A tiny British trawler, made smaller in contrast with the towering ice-clad cliff, lying at safe anchorage after a five weeks' buffeting about on the North Atlantic. The ship, forced out of a west-bound convoy by engine trouble, was located by a

Coast Guard cutter and towed to this Greenland inlet. Temporary repairs were effected and the freezing and half-starved British sailors were fed and given first aid aboard the cutter.

RESCUERS COMMENDED

Crawled Through Snow to Save Sick Man in Aleutians

AN ALEUTIAN BASE, Feb. 1 (P)—Crawling on hands and knees through a snow-choked mountain pass in temperatures that frozen even the salt solution in their medical kits, a Navy medical officer and his assistants reached—and saved—their patient.

An announcement today saying that Vice Admiral Frank Jack Fletcher, North Pacific commander, had commended the men, disclosed their heroic mercy trip on Unalaska Island on Nov. 20-21.

Lieut. A. B. Carson of Oakland, Calif., was the senior medical officer of the group. Lieut. (j.g.) E. G. Beard of Park Ridge, Ill., and other Seabees helped to break the trail as the party set out to reach the sick man, Jess J. Breckenridge, second-class steamfitter.

The barometer at Dutch Harbor dropped to its lowest, stormiest mark on record, and travel by air or boat was impossible. The only alternative was the twelve-mile trip through the pass on foot, which even in summer takes six to eight hours. Despite snow and winds that at times reached seventy miles an hour, they made it in eleven hours and an appendicitis operation saved Breckenridge's life.

Eskimo 'Blubbers' Over Italian Candles

NAPLES, Italy, June 2 (Reuter)—Sergeant, Henry Kablun, the only full-blooded Eskimo in Italy, has a complaint.

He says the candles in Italy are made from mineral ores and they play havoc with his digestion.

In Alaska, Sergeant Kablun is used to fine tallow candles made from moose fat.

"They are the greatest delicacy in the world," says the Sergeant, "except, perhaps for seal blubber."

An Intrepid Explorer for the Czar

JOURNEY INTO THE FOG. By Cornelia Goodhue. 179 pp. New York: Doubleday, Doran & Co. \$2.50.

By THEODORE STRAUSS

BY a deathbed decree, Peter the Great in 1725 commissioned Vitus Bering, a Danish sea captain in the Czar's service, to discover whether Asia and America were joined by a land bridge in the North Pacific—or separated by the strait then called Anian. Actually, the question had already been settled fourteen years earlier by a Siberian tribute gatherer, one Popov, who had reached land's end at East Cape, but his report had been considered so inconsequential that it was buried in provincial archives and was never forwarded to St. Petersburg. Thus it was not until the summer of 1728 that Bering, coasting northward from Kamchatka into the Arctic Ocean, officially determined the fact that Siberia and America were separated by a body of water. How wide, he did not know. Both on his northward passage through Bering Strait and on his return, the mainland of Alaska lay shrouded in fog hardly thirty miles away. Not until a decade and a half later was Bering to discover the American mainland itself, and at a point hundreds of sea miles southeastward.

It is that second voyage of Bering's that is largely the burden of Miss Goodhue's compact "Journey into the Fog." Of all the voyages in the annals of exploration, it is one of the most dramatic and least generally known. When in 1741 Bering set sail into the North Pacific with two eighty-foot ships, each crammed with supplies and a list of seventy-five men, the mysteries of that sea were nearly as great as those of the Atlantic when Columbus set forth to discover the New World. Among Bering's orders was an instruction that if he should encounter foreign ships he must not show them "the way back to Kamchatka." The incredible hardship of that voyage made glory cheap. Bering's crew lacked the bold and vaunting spirit of the Elizabethans, the self-imagined splendor of Drake's men. And it is said that Bering himself merely shrugged his shoulders when on July 27, 1741, after a vain search for Gamaland—a capricious continent which existed only in the minds of Europe's mapmakers—he first saw the St. Elias Range rise massively from the American mainland.

And well he might! For Bering, plain and patient man that he was, had had his ardor drained by the most preposterous obstacles. The discovery of

America was almost incidental to the mountainous tasks set for him by the Imperial Academy of Science. Not only was he to haul vast supplies from the Gulf of Finland thousands of miles to the Sea of Okhotsk, but take with him no fewer than a thousand men. This included a corps of scientific elite who insisted on traveling in considerable style with tons of equipment and sundry comforts such as a small library which included "Gulliver's Travels"—a volume then considered by some as an account of authentic exploration. Certainly, Swift never wanted for richer bait.

Eight years after leaving St. Petersburg only two of the scientists—George Wilhelm Steller, the brilliant German-born naturalist, and Louis DeLisle, an adventurous brother of Europe's most famous mapmaking family—accompanied the St. Peter and the St. Paul when they sailed from Petropavlovsk. The ships were separated at sea—accidentally, although Miss Goodhue makes a poorly founded speculation that it was due to intrigue of Chirikov, the lieutenant in command of the St. Paul.

Chirikov sighted the American coast at a point south of present-day Sitka and after an ill-fated landing brought the St. Paul back to Kamchatka. Bering, aboard the St. Peter, was less fortunate. After a brief landing at Kayak Island, off the South Alaskan coast, he turned westward hoping to reach Petropavlovsk before the bitter autumn gales. But the storms caught him.

On the eastward passage, he had run some 300 miles south of the Aleutians without ever suspecting the presence of the island chain. Now, hurled back upon his course by a three-week cyclone, Bering could hardly avoid these baffling islands. Packed in the foul-smelling quarters every officer and enlisted man was scurvy-ridden. Men died almost daily and the officers dared not lower anchor or sails because there was not enough strength in the crew to draw them up again. After endless weeks, when only the sickness of the men must have avoided mutiny, they landed at Bering Island in the Commander group. There the men lay more dead than alive, harried by swarms of foxes which mangled the dead before they could be buried. Bering himself died during the winter, not knowing where he was. The following spring the survivors built a new craft out of the wreckage of the St. Peter and finally returned to Petropavlovsk.

In retelling this story, Miss

Goodhue has taken certain liberties which are not always justified—either by the necessities of dramatic construction or by fact. Perhaps her greatest historical sin has been committed against the character of Steller whom she makes the villain of the piece. Admittedly Steller was an opinionated and uncharitable man. But a good deal of his testiness may be understood when one considers the plight of a brilliant scientist doomed for endless months to the company of men who had no appreciation of the researches in which he was interested. It is probably not too much to say that without his knowledge of scurvy treatment

none of the expedition might have survived at all.

Of that voyage into ghostly and gale-ridden seas, perhaps only a Coleridge or a Melville could do justice. Miss Goodhue's account is written in a plain, schoolbook style that does not at any point match the drama of its theme. But the drama cannot be quenched. The book is valuable—if only for the reason that it might drive abler imaginative minds to the same sources that she used—particularly F. A. Golder's authoritative "Bering's Voyages." Meanwhile she has given the reading public an interim account of an extraordinary episode in heroism—a dogged, dirty heroism, in which the strengths and shortcomings of its protagonists were inevitably and pitilessly revealed. But perhaps that is what heroism is.

Man Versus Nature

ARCTIC MANUAL. By Vilhjalmur Stefansson. Prepared under direction of the Chief of the Air Corps. 556 pp. With index, introduction and photographs. New York: The Macmillan Company. \$3.

By EARL PARKER HANSON
Geographer and Explorer

Stefansson's "Arctic Manual" is in a sense a reprint. It was first prepared in 1935 at the request and expense of the Army Air Force; then it was published in a very limited edition by the Government Printing Office; very shortly thereafter it was so thoroughly sold out that thousands who needed it weren't even aware of its existence. But random reports on recent new German arctic techniques seem to bear out the rumors that the enemy has made use of this book. Now the Army has given permission for the present commercial edition—to which a special introduction, a comprehensive index and a number of photographs have been added.

This meticulously detailed book of over half a thousand pages starts with a general discussion of what kind of country the Arctic really is, and then proceeds to specific advice on how to get along there in safety and comfort. With its aid any literate person with the mother-wit of a tenderfoot Boy Scout can design tents, clothing, rations, sleds, dog-harnesses, sleeping bags and cookstoves that are essentially correct for the Arctic. He will also understand why they are correct and can then go out and use them. Finally, he will learn the technique for getting along without thousands of the things turned out by our factories that are as often as not so inadequate as to be actually dangerous.

Among a host of other things,

the detailed instructions on how to build an Eskimo snowhouse, a better, safer and more comfortable shelter in the country and season for which it is suited than any tent that can be devised, are extremely important to all men in the field. So are the discussions of the techniques of hunting game, based on a study of the game's habits. The discussion of diet in general is important to all intelligent readers in that it again knocks over so many of our commonly accepted ideas about nutrition in general. Stefansson is famous for having proved to the medical world that any human being can get along in perfect health and in any climate on fat meat alone, without benefit of sugars, starches or other vegetable matters; but from what I have been able to observe, the lesson needs still to be driven home on a wider front.

This is especially true regarding the North, where animal foods are far more plentiful than vegetable foods. It is overwhelmingly true—as is here brought out in the discussion of pemmican—with regard to emergency rations. The best such ration that the nutritionists of our present Army have yet been able to produce for prolonged sustenance weighs almost three pounds per man day. Literally millions of Indians (and those men in our Army who used to fight Indians), explorers and fur-traders got along well for centuries on three-quarters to one pound per day of pemmican, which is nothing but a properly balanced concentrated ration of meat and fat. That difference in weight and bulk may well mean life or death to many United States soldiers drifting on liferafts, stranded in jungles, "lost" in the Arctic or cut off from their bases.

Greenland's Ice Cap

WAR BELOW ZERO. By Colonel Bernt Balchen, Major Corey Ford and Major Oliver La Farge. 127 pp. Boston: Houghton Mifflin Co. \$2.

By **RUSSELL OWEN**

THERE have been stories of incredible adventure in this war and thrilling tales of the plight of aviators after they crashed on land or sea, but this is the first one of men who cracked up on the Greenland ice cap. And that spot is the loneliest, most inaccessible, most dangerous, God-forsaken bit of territory in the entire northern hemisphere. The region is several thousand feet high, dark nearly all the time in winter, searingly cold and blasted by vicious winds. Only one explorer ever lived there willingly—and he had a picnic compared to what the men of the wrecked B-17 went through in Major La Farge's narrative.

They didn't all get out. One went down a crevasse and was never seen again; another was killed in the crash of a rescue plane, and of the rescuers one also disappeared in a crevasse and two were killed in a plane crash. Another came out with both feet frozen so badly they had to be amputated. But that they got out at all is remarkable.

THEIR plane was on a searching mission when it cracked up. Flying over the snow of the ice cap is risky business, for there are times when it is impossible to see the surface, and the pilot does not know whether it is a thousand feet below him or only just under his fuselage. One pilot of a flying boat found that he was making only sixty miles an hour, to his horror, and then discovered that he was plowing gently through snow instead of flying. That is what happened to this

B-17, except that the stop was abrupt and tore the plane in two, with its tail resting over a crevasse. None of the crew were killed, but they were badly shaken up and one broke his wrist.

From then on for 119 days, when rescuers directed and led by Bernt Balchen finally reached the plane, they lived a life that no one can imagine who has not been through it. Major La Farge has told the story in such simple, vivid words that one can almost experience a sense of suffering, of cringing from the conditions these men faced.

DURING these four months others outside, only a few miles away, were defying the ice cap to reach them. Dog team parties were organized. An amphibian was flown in successfully but was wrecked on the way out. A special plane equipped with skis was brought from Canada and wrecked, and finally two lumbering flying boats, Catalinas, were sent from the States to make the desperate attempt to land on the soft snow of the ice cap. They made it, and the survivors were finally brought out.

The story of these rescue attempts, attempts involving plans that reached out thousands of miles to gather in material that might be used; the constant efforts of Turner and his big plane in taking off in weather that would make any pilot's hair curl—all these make up some of the best reading in "War Below Zero." It is an epic story.

Other chapters in the book (as told by Bernt Balchen to Major Corey Ford) describe the establishment of our flying bases in Greenland, and the part that aviation played in cleaning the Germans from that region.

national highway," as Secretary Ickes described it "**** breaking geographical frontiers, slashing and bulldozing its way through the stumps of nationalism."

Boys of today have an almost unslakable thirst to know how and why things are done. They will find here how one of the toughest engineering feats of our time was accomplished. Even if, like this reader, their knowledge of engineering has been confined to damming a small creek, they will understand from Mr. Coe's graphic descriptions how bridges were thrown across racing Arctic rivers, how impassable muskeg bogs were conquered by corduroy road-bed, how mountains were cut down and trees plowed up. They will almost feel the sub-zero cold, the sting of summer mosquitos, the fatigue and loneli-

Muddling in the North

OUR HIDDEN FRONT. By William Gilman. Illustrated by map and photographs by the author. 250 pp. New York: Reynal & Hitchcock. \$3.

By **JIM MARSHALL**

IF anyone has lingering doubts that God had his arm around our Alaskan shoulders during the first year of the war this book will dispel them. Here, for the first time, is a detailed record of the appalling muddling, ignorance and waste of men and material that took place between the Alaska Military Highway and the farthest west Aleutians from Pearl Harbor until a few months ago. At almost any time during the first few months of this period the Japs could have landed an army almost anywhere they chose; they could have captured Dutch Harbor, Seward or Anchorage and marched on through Fairbanks and down into Canada.

Why they didn't (for they knew more about our helplessness than Americans were allowed to know) is one of the war's great mysteries. But it was heaven's gift horse to America. Mr. Gilman, an experienced newspaper man who got to Alaska first of his tribe and stayed there longest, here looks this incredible gift horse in the mouth.

EVEN today, Mr. Gilman writes "our achievements in the Aleutians * * * do not justify jubilation. We have only taken back what we should not have lost in the first place." We lost territory and ships and planes and men because of naval, military and bureaucratic "ignorance of and disinterest in Alaska." Even three months after Pearl Harbor the Army was spurning a military highway to the Territory. In 1937 the Navy had fought against a \$100,000,000 appropriation for naval bases that might have saved a Jap invasion of our soil.

This disinterest came to a peak on Dec. 7, 1941, when our Army headquarters in Alaska had to learn of the outbreak of war from a small private broadcasting station in Fairbanks—and to deduce (on its own initiative) that Alaska probably would be attacked. Washington had thought it unnecessary to notify Gen. Simon Bolivar Buckner!

Then, after the war started, with everyone in the Territory aware that the Japs could walk

in almost unopposed, construction of bases and airfields was delayed by labor unionists. At one labor meeting in Anchorage which he attended, Mr. Gilman heard a construction foreman warn his fellow unionists:

"Go slow, take it easy. Got to make the work last."

The result of all this—six months after Pearl Harbor—was summed up by an officer: "Here we are, perched on a hard country where civilians can't feed themselves. The Japs don't even have to attack. They need use only submarines to cut our umbilical cord from Seattle and we'll be starved out."

Why the Japs didn't do it no one—not even Mr. Gilman—knows.

OF all this muddling and delay, this sabotage, the squabbles between Army and Navy for "credit," even of the infiltration of the Japs into the western islands, the American people were allowed to know little or nothing. What reports were issued at Washington usually were glowing—and completely erroneous. Censorship—"a useless stupidity"—got to the point where the Western Defense Command shut out all news because news would "focus attention of the public on Alaska."

What was going on in the Territory was so appalling that Army, Navy and the Washington management were afraid to let it out.

Now, having lifted the veil from some of the bungling and ignorance and waste, Mr. Gilman also lifts it from the heroism and initiative of the humble fighting men who met and licked not only the Japs but the weather. The weather was worse: there were periods when fog and gale downed four planes to every one prey to Zeros. There are stirring accounts of incredible air, naval and land battles in the fog and through them runs the immemorial tragedy of brave men in uniform sacrificed to incompetence.

This is an important book. It is a book to make you mad, to frighten you with the facts about the war's mismanagement at Washington—and to make you proud of the boys who did the fighting and stuck it out until the danger had passed.

Road to the Arctic

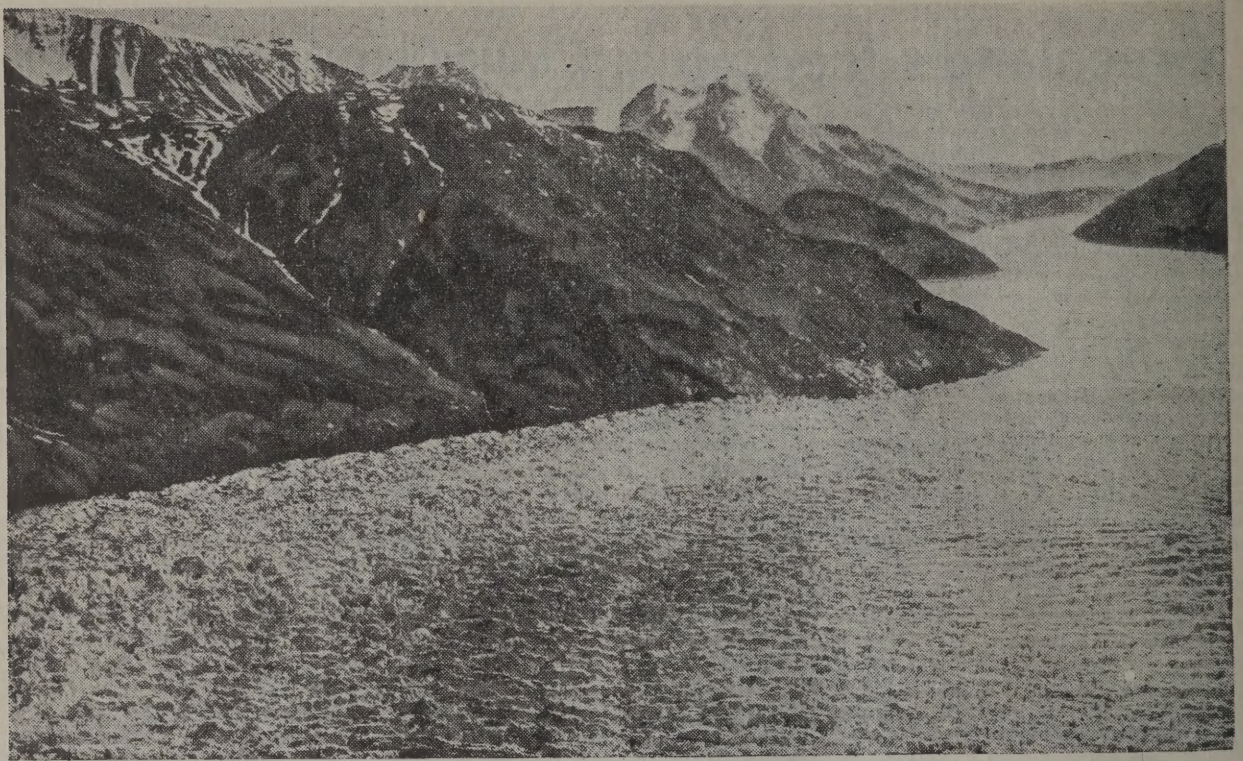
ROAD TO ALASKA: The Story of the Alaska Highway. By Douglas Coe. Illustrated by Winfield Scott Hoskins. 175 pp. New York: Julian Messner. \$2.50.

SOME experts said it couldn't possibly be done. Others laughed at the very notion of doing it in a year's time. But the United States Army and the Public Roads Administration, thought differently, and today the Alcan Highway stretches 1,600 miles across the northern wilderness. Completed in the staggeringly short time of eight months and eleven days it is, in these days of war, a military lifeline to Alaska. In the peace to come it may well prove a "truly inter-

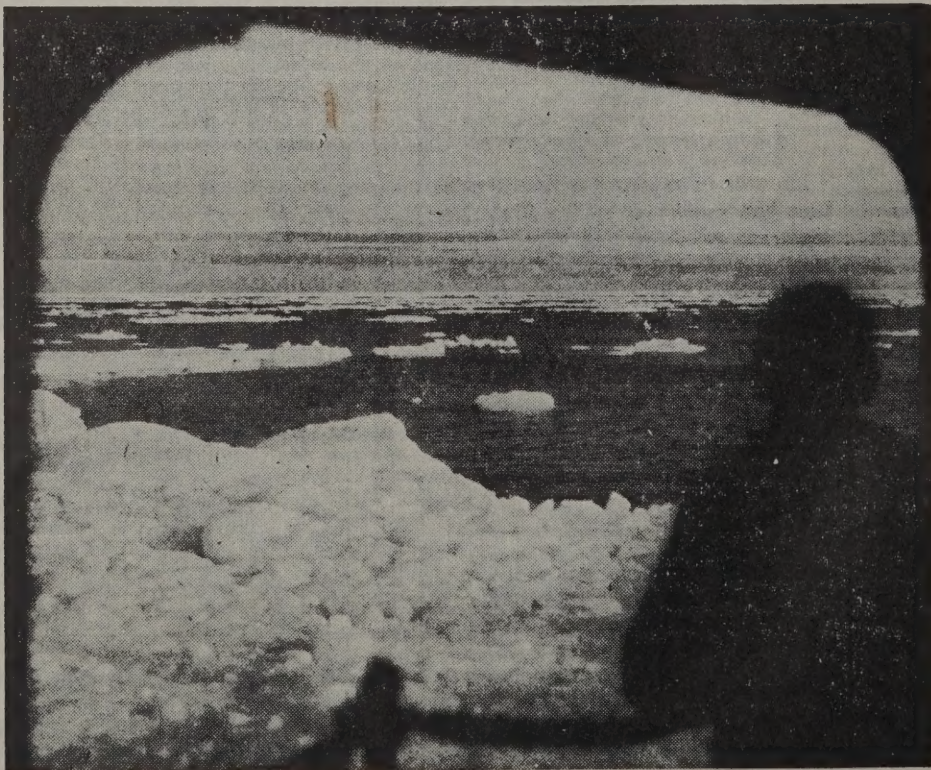
ness which the boys from Brooklyn and Birmingham, Ohio and Texas endured. For extra measure there are maps and fine pictures by Winfield Hoskins. These do more than illustrate, they underscore the conditions and the magnitude of the task accomplished.

Rawhide Knots for Arctic Sleds

SOUTH BEND, Ind.—Assembly crews at the Studebaker plant here have become skilled in knot-tying, for rawhide thongs are used instead of bolts on wooden transport sleds for arctic troops, because metal snaps under subzero stress. Each sled requires eighty-three knots.



This picture, among a group just released from secret files by the Army Corps of Engineers, depicts a glacier along the edge of the great ice cap in Greenland



A seaman on watch stands silhouetted on the deck of a Coast Guard combat cutter nosing its way through icy waters. This sector of America's

defense provides a beautiful, if monotonous, scene for the men aboard the patrol ships.